The RUBBER AGE

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LATE NEWS of the Industry

Goodrich Votes $30,000,000 Note Issue; Approves Large Common Stock Increase

STOCKHOLDERS of the B. F. Goodrich Company at a special meeting held on May 12 authorized the issue of $30,000,000 fifteen-year 6 per cent convertible debentures and approved the increase of the common stock of the company from 1,500,000 shares to 4,000,000 shares. The entire issue of debentures, it was announced, has been underwritten by a banking group consisting of Otis & Company, Goldman, Sachs & Company and the Chase Securities Corporation. It is also understood that the group will include the Continental Illinois Company of Chicago and the C. T. Securities Company of Cleveland.

The debentures were offered to stockholders of record as of May 2 for subscription on a basis of $25 par value of debentures for each share of common stock held, and the unsubscribed portions of the issue, if any, were scheduled to be offered for public subscription after May 22. A portion of the additional common shares authorized are required to provide for the conversion of the debentures, which are planned to be convertible on the basis of $65 a share during the first two years; $70 a share during the next three years; $75 a share during the next five years; and then at $80 a share until maturity.

While the company is said to have no plan at present for the issue of the remaining common shares, the board of directors believes that it is to the best interest of the company to have additional shares available for issuance by the board for such consideration as it may fix from time to time, so that advantage may be taken of such favorable opportunities as may arise.

At the annual meeting of the Goodrich stockholders on May 7, dircetors whose term of office expired were re-elected. At the directors' meeting on the same day, officers of the company were re-elected and in addition J. H. Connors, general manager of the mechanical division, and Arthur B. Newhall, general manager of the footwear division, were elected vice-presidents.

Both of the new vice-presidents are comparatively new members of the Goodrich organization, Mr. Connors having joined the company last August after resigning as president and general manager of the Republic Rubber Company, Youngstown, O., and Mr. Newhall coming to the company last September when his former firm, the Hood Rubber Company, was merged with Goodrich. Mr. Connors, however, served his apprenticeship in the Boston, Mass., branch of the B. F. Goodrich Company and in 1916 was promoted by Goodrich to the position of manager of Diamond mechanical goods sales at Philadelphia. He was later transferred to company headquarters at Akron and in January, 1920, became manager of Diamond mechanical goods sales for the Akron division, resigning in January, 1922, to undertake the rehabilitation of the Republic Rubber Company, then in receiver's hands. Mr. Newhall was connected with the Hood Rubber Company for many years, has been a director of the Rubber Manufacturers Association since 1926, and is well known throughout the industry.

The stockholders also voted to retire 11,880 shares of preferred stock in accordance with the charter provisions. The regular dividend of $1 on the common stock payable June 1 was declared by the directors.

Mail Order Houses Cut Tire Prices In Their Mid-Summer Sales Catalogues

BOTH Montgomery Ward & Company and Sears, Roebuck & Company have reduced tire prices in the mid-summer sales catalogues mailed to their several million customers this month, the cuts ranging from 4 to 6 per cent on all types and sizes. The new prices will be in effect until August 31 at Sears, Roebuck's ten mail order houses and 320 retail stores and throughout the Montgomery Ward chain.

Montgomery Ward's catalogue shows, for example, that the Ford size Riverside casing is reduced to $5.55 from $5.79, a cut of 4.1 per cent. Sears, Roebuck & Company have reduced tire prices an average of 5 to 6 per cent on All-State balloons, the Ford size being cut to $5.55 from $5.85, a decrease of 30 cents or 5.1 per cent. It is pointed out in the catalogue of the latter company that the current Ford tire price compares with a price of $11.25 in 1926.

Coming at the same time as the mail order companies' discontinuance of free postage, these tire cuts have not been taken very seriously in the trade. One authority states that "the announced reduction of tire prices of two of the large mail order houses had no effect as it is felt that this discounts the cancellation of paying freight charges by the same companies. The reduction of 4.1 to 6 per cent probably will have little, if any, effect on tire prices of the leading manufacturers. It seems certain that in no way will

it affect the standard line tires of any of the principal companies.

"The mail order houses establish a sales price on tires during the summer months and this price must be met by the manufacturers as in the case of a sale by any local dealer. However, any decline in price will affect only the line in immediate competition with the mail order houses, notably the Pathfinder of Goodyear, the Cavalier of Goodrich, the Anchor of Firestone, and the Peerless of United States Rubber. The standard brand of tires produced by the four leading companies will remain unchanged, and the lower price on the second line will remain in effect only for the duration of the sale."

United States Rubber Consumption Totaled 40,207 Tons During April

CONSUMPTION of crude rubber of all classes by manufacturers in the United States in the month of April is estimated at 40,207 long tons, according to statistics compiled by the Rubber Manufacturers Association. This compares with estimated consumption of 35,914 long tons in March and with 47,521 long tons during April, 1929.

Imports of crude rubber of all classes into the United States during the month of April totaled 49,927 long tons, according to estimates issued by the Rubber Manufacturers Association. This compares with imports of 45,430 long tons in March and with 54,171 long tons in April, 1929.

Consumption of reclaimed rubber is estimated by the association at 17,321 long tons for April, as compared with 15,616 long tons in March and 21,574 long tons in April, 1929.

The association estimates total domestic stocks of crude rubber on hand and in transit overland on April 30, at 148,272 long tons compared with 141,843 long tons as of March 31 and 107,658 long tons as of April 30, 1929. Crude rubber afloat for United States ports on April 30 is estimated at 63,261 long tons as against 63,646 long tons on March 31 and 65,790 long tons a year ago.

Symposium on Rubber Belting Planned For Meeting of A. S. T. M. Next Month

MEMBERS of the American Society for Testing Materials will assemble for their 33rd annual meeting at the Chalfonte-Haddon Hall, Atlantic City, N. J., on June 23. A program of committee meetings, special sessions and recreation events will occupy the time of the members until June 27, with papers and discussions relating to the rubber manufacturing industry scheduled during the week.

The third session of the convention on Tuesday, June 24, will be devoted to the three subjects of rubber, textiles and coal. W. B. Wiegand, chairman of Committee D-11 on Rubber Products, will report progress in the work on abrasion tests for rubber products and on methods for testing flow under compression on rubber products used to absorb vibration. Reports will also be included on the preparation of specifications for insulated wire and cable, so modified as to permit the use of organic accelerators and anti-oxidants authorized.

Papers will then be read in the symposium on rubber belting. These will include discussions by J. E. Skane on "Performance Characteristics of a 4-inch 4-ply Rubber Transmission Belt, Branded Condor"; by C. W. Staake on "Stretch in Rubber Transmission Belting"; by E. G. Kimmich on "Service Tests on Rubber Belting"; and a special paper by H. A. Depew and H. C. Jones on "Laboratory Flexing as an Aid in Investigating the Pneumatic Tire Carcass."

The report of W. H. Whitcomb, chairman of Committee D-13 on Textile Materials, will follow. Among other features, this report will present for immediate adoption revisions in standard specifications for tolerances and test methods for tire fabrics other than cord fabrics, and for cord tire fabrics. It will also propose revisions in tentative specifications for chafer tire fabrics and methods of identification of textile fibers. A paper will be read by Ephraim Freedman on "Thermal Transmission of Fabrics."

The report of H. S. Vassar, chairman of Committee D-9 on Electric Insulating Materials, which will be read on Wednesday morning, June 25, is also expected to be of interest to rubber men. At the twelfth session on Friday morning, June 27, there will be a special symposium on rosin, which will include a paper by Dr. H. A. Winkelmann on "The Use of Rosin in Rubber Goods and Rubber Reclaiming."

Production of Casings During March Was the Highest Since August, 1929

ALTHOUGH the total domestic consumption of crude rubber during March was below that of January, statistics compiled by the Rubber Manufacturers Association, Inc., show that production of automobile tires in that month reached a higher figure than in any month since August of last year. The increase, as usual, was in balloon casings, with high pressure tire output falling back to the lowest levels since January, 1921. Balloon casing production was the highest for any month since last July, while balloon inner tube output exceeded any month since June, 1929.

Tire factories in the United States produced a total of 5,187,970 pneumatic casings during the month of March, according to the estimates issued by the Rubber Manufacturers Association. Total production of inner tubes is estimated at 5,270,560 and total production of solid and cushion tires at 25,772 for the month. Total tube output was the highest that has been recorded for any month since last October.

While this output of casings represents an increase over the February total of 4,859,475 units, it is still considerably below March, 1929, when 7,519,234 casings were turned out. Shipments were again somewhat lower than production, and inventories, therefore gained slightly over the figure for the end of February. Total shipments are estimated as follows:

Pneumatic casings, all classes.....	5,031,820
Inner tubes	5,042,385
Solid and cushion tires.....	31,935

Inventories as of March 31 are estimated as 13,468,970 for all pneumatic casings; 14,057,360 for inner tubes, and 164,238 for solid and cushion tires. The solid and cushion tire classification proved an exception from the course of other tires during March, experiencing a lower production, higher shipments and a consequent reduction in inventory.

The tire industry is estimated to have consumed 58,547,901 pounds of crude rubber and 19,541,316 pounds of cotton fabric during the month of March in the manufacture of all types of pneumatic casings, tubes and solid and cushion tires.

The association's estimates are based on reports furnished by manufacturers who produce approximately 75 per cent of the total for the United States, but have been adjusted to represent 100 per cent in the above figures.

New York and Akron Chemists Hold Spring Group Meetings

AN INTERESTING and distinctly unusual dinner meeting of the New York Group, Rubber Division, A. C. S., was held the evening of May 22 in the Silver Grill Room of the Lexington Hotel, New York City. Both in the location of the meeting and the form of entertainment, it was a departure from the previous gatherings of the group. Heretofore, most of these affairs have been held in the Town Hall Club and the entertainment has been furnished by local talent from among the membership.

After an excellent dinner, the group listened to three brief talks on "Unusual Uses for Rubber." During the dinner and throughout the evening the gathering were entertained by a novelty orchestra, the "Jake Hayseeders," well-known for their broadcasting programs of "Main Street Sketches," a regular feature of station WOR. They appeared through the courtesy of the American Hard Rubber Company, of which a number of the orchestra are employees. The evening was further enlivened by the humorous recitations of Fred C. Batchellor, of the General Atlas Carbon Company, who was particularly clever in his French-Canadian dialect stories.

Brief abstracts of the talks given at the meeting follow:

ABSTRACTS

Rubber to Prevent Ice Formation on Airplane Wings

W. C. GEER, *Guggenheim Foundation*

Three years experimental work has developed a mechanical device for the removal of ice formation on airplane wings. The device is a light-weight thin rubber overshoe or pneumatic hose for leading airplane edges only, with fabric backing for strength. In the front edge of the overshoe is an air tube and a rubber oil holding layer is over the outer surface. The inner tube is connected by pressure tubing to a pump. It lies flat on the wing or strut with the tubes collapsed, thus altering but little the curvature of the wing or strut. When ice forms, the pilot turns air into the tubes slightly expanding them. This moves the ice, breaks the vacuum, and since the adhesion to the oiled rubber is essentially zero, the ice becomes loosened on the plane and is blown away.

Rubber in the Grinding Wheel Industry

J. N. KUZMICK, *Raybestos-Manhattan, Inc.*

Bulk of abrasives now used in manufacture of grinding wheels being crystalline alumina (A1 0) for metals of high tensile strength and Silicon Carbide 2 3 (Si.C) for metals of low tensile strength.

High tensile strength of rubber bond compared with inorganic bonds permits use of peripheral speeds up to 3,000 meters per minute, as against 1800 meters per minute for inorganic bonds resulting in an enormous increase in cutting ability.

Rubber bond abrasive wheel mixtures mixed on differential rolls are desirable where very fine finishes are in demand. When extremely fast cutting wheels are desired, a jell is formed from the rubber base stock with a suitable solvent. The abrasive granules are then admixed in a dough mixer. This type gives a more porous wheel structure.

Rubber in the Chemical Industry

D. E. JONES, *American Hard Rubber Company*

Reference is made to the variety of products made from hard rubber and to its physical properties. Its application in the chemical industry are described, together with some special applications for soft rubber. The other classes of hard rubber products are divided into three classes; namely, sheets, rods and tubes, and molded articles. The use and manufacture of hard rubber dust is explained briefly. The use of hard rubber in the chemical industry is increasing, although hard rubber has been replaced by other materials in certain lines, such as battery cases.

Akron Session Well Attended

MORE than 275 members and guests of the Akron Group, Rubber Division, A. C. S., attended the meeting at the Akron City Club on May 12. This was the second meeting of the year. Following a well served and enjoyable dinner, six papers on various phases of the rubber manufacturing industry were presented. Brief abstracts of the papers read are given below:

ABSTRACTS

Laboratory Evaluation of Flex Cracking Resistance

L. V. COOPER, *Firestone Tire and Rubber Company*

Data was presented on flex cracking of different types of tread stocks. The machine used was of the DeMattia type and a dumbbell test piece was used stretched from 0 initial tension to 50-75 and 100% elongation.

Modern Statistical Machinery Applied to Rubber Compounding

J. D. MORRON, *Mechanical Rubber Company*

The paper showed how it was possible by the use of a sorting machine to save considerable work in compounding. Where five hundred or more compound cards are to be classified, holes are punched in order that they might be classified according to most any combination of characteristics, such as color, tensile, percentage of break, hardness, etc. When a compound is to be used requiring any certain characteristics, the machine is set and the cards passed through it quickly and all the compounds possessing the desired characteristics are sorted from those undesirable. A very enlightening as well as entertaining movie of the system in actual operation was presented.

Quality Control in Tire Manufacture

JOSEPH TORREY, JR., *Goodyear Tire and Rubber Company*

The paper presented some of the problems encountered in organizing and operating an efficient and thorough inspection department.

Airplane Tires and Wheels

HENRY SCHIPPEL, *B. F. Goodrich Company*

The paper explained some of the mathematics involved in calculating the sizes of tires necessary for different types of airplanes.

(*Continued on page* 199)

By What Plan
Can Restriction Succeed?

THE real and permanent interests of the rubber industry will not be served by restriction of output, but by lowering costs of production, it was stated by H. J. Welch, chairman of the Rubber Plantations Investment Trust, the largest holding company of British producers, at the recent annual meeting of that body in London.

"Doubt is felt by some people as to whether any practicable scheme for restriction of output will prove to be of permanent benefit to the plantation industry," Mr. Welch declared. "It is pointed out that the government scheme, like the present one, affected only a section of the producers, and that it strengthened the resources of the producers outside the scheme, encouraged native plantings and production, and helped to extend the reclaimed rubber trade.

"So far as I can judge at present, however, the adverse effects of the government restriction scheme are unlikely to follow restriction when the price is at or below the average cost of production of well-managed European estates, notwithstanding that such restriction is effected only by a section of the producers, provided they cease restricting when prices rise above such average cost.

"If and when, as at present, surplus stocks obviously exist, and the net price is only about or below such average cost of production, it seems to me quite reasonable to stop adding to such excess stocks. Excess stocks have to be paid for by producers in depressed prices twice over—once while they are accumulating, and afterwards while they are being absorbed.

"It would be unwise, however, to ignore the important fact that native areas (apart from what are known as 'Asiatic-owned estates') probably now represent at least two-fifths of the total area planted, and no one knows their full productive capacity. The Dutch authorities estimate that immature native areas in the Netherlands Indies are more than twice as extensive as the present native mature areas there. These native areas are generally more closely planted than the European estates, and, it is said, give a higher yield per acre. Any resting of them caused by the low price doubtless increases their potential output when prices rise high enough to bring them into tapping again. Further, when the price is high, not only does it bring out more supplies of rubber from the native areas, but new areas are extensively planted by the natives.

"IF the industry was a monopoly, restriction of tapping with price as the factor of regulation would undoubtedly be sound and effective, but at least two-fifths of the total area planted with rubber is owned by natives whose adhesion to a common policy can not be secured," says H. J. Welch, chairman of the $20,000,000 Rubber Plantations Investment Trust.

"HOWEVER advisable, therefore, may be temporary restrictions, our real and permanent interest will doubtless be found not in restriction, which increases the cost, but in lowering the cost of production by every method consistent with the preservation of the agricultural value of our estates. Already many European estates are producing at a figure which a few years ago would have been thought impossible, and budded rubber and other scientific advances will doubtless further increase yields and reduce the cost.

"Obviously a low cost will strengthen our hands in competing with the native product and reclaimed rubber. Also, if we supply the world with a low-priced rubber it must tend to increase its use generally. It follows that if any future agreement for restriction affecting a section of the producers only becomes necessary, it should depend on the net market price at the time of restriction not exceeding the average cost of production of well-managed European estates.

"IN CASE the May cessation of tapping should not prove sufficient, it may be worth while to mention another scheme that has been suggested, and which I think well worthy of consideration. It is for the restricting producers to agree to cease tapping for seven consecutive specified days in every month, following any month in which the average of the spot price in London of standard quality smoked sheet rubber does not exceed 9d. per lb. It is estimated that 9d. would approximately cover the average 'all-in' cost of well-managed estates, if allowance is made for the off grades of rubber produced, and for selling charges and the overhead expenses.

"Such a scheme has the advantage of not seriously disorganizing labor, of being directly linked up with the price, and of ceasing to operate as soon as a profit-making price is obtained. It should bring out more native rubber; it should decelerate the accumulation of unwanted stock; it ought not to antagonize manufacturers; and it would operate fairly as between the different countries of production.

"Evasion of this scheme by restrictors would, in most cases, be as easy of detection as under the present scheme. If some such scheme could be tried for a year to operate automatically when the monthly price is below 9d., at the end of that period its economic effect could be carefully studied (particularly its effect upon native output), and the question of the wisdom of its renewal or of any necessary variation of its terms decided."

The Rubber Industry *and* Trade *of* POLAND*

Notable Progress Has Been Made Since 1925—Approximately 20 Rubber Factories Operating—Marked Increase in Rubber Footwear Exports

THE Polish rubber industry during 1929 made more rapid progress than in any preceding year. The large increase in exports and decline in imports of rubber goods combined resulted in a reduction of the unfavorable balance of trade in this item of $2,682,000 in 1929 from $5,834,000 in 1928. This marked gain was the result of the development of exports of rubber footwear—increasing to 1,117,600 kilos from 11,200 kilos in 1928. Poland can now be classed among the important rubber-footwear producing States of Eastern Europe.

The development of the Polish rubber industry in 1929, however, was handicapped by the prevalent general economic depression and credit stringency. The Pepege company, of Grudiadz, Pomerania, the largest Polish manufacturer of rubber goods, secured a loan of $2,000,000 from Les Establissements Hutchinson, of France. The loan agreement gives Pepege the right to market Polish-made rubber goods in France under favorable terms.

The Pepege company, organized in 1923, is the most important concern and occupies an area of 150,000 square meters with an average employment of 8,000 workers during 1929. Its daily output of rubber footwear is reputed to be around 50,000 pairs. The production of rubber footwear, however, does not occupy the chief interest of the company, for during 1929 it reentered the field for the manufacture of pneumatic casings and inner tubes. Besides, it produces rubberized garments and all kinds of mechanical rubber goods.

The "Gentleman" concern of Lodz employed around 1,000 workmen during the past year, and is the most important factory after Pepege. "Wolbrom," near Kielce, was incorporated in 1911 and now maintains a working force of about 700. It manufactures rubber goods mainly for technical uses. "Kauczuk," of Bydgoszcs, produces technical and surgical rubber articles, whereas "Wargum," of Warsaw, produces rubber tissues for all purposes, but mostly for military uses. Other important factories are "Schweikert," of Lodz, and "Guma-Rubber," of Warsaw.

Prior to 1914 only one rubber factory existed in what is now Poland, the market being suppied mainly by the large Russian plants of Treugolnik and Prowodnik, and to a lesser extent by the German and Austro-Hungarian factories. Since 1925 the Polish industry has made notable progress, partly because of the restrictions against importation of German goods during the period of the tariff war with that country. There are now about 20 rubber factories operating in Poland with approximately 10,000 employees. In 1927 production of manufactured rubber goods amounted to 1,753 tons. In the absence of production figures for the past two years, the imports of crude rubber into Poland may be taken as an index of the progress made by the industry. Imports of the crude material advanced from 1,850 long tons in 1928 to an estimated 2,200 long tons in 1929.

The products turned out by the local industry include footwear of all kinds, automobile and bicycle casings and tubes, rubber fabrics, rubber hose, packing products, and various articles used by the industries, hospitals, household, military forces, and aviation.

Polish Trade in Rubber Goods

(Units in thousands)

Item	Exports				Imports			
	1928		1929		1928		1929	
	Quantity *Quintals*[1]	Value *Zlotys*[2]	Quantity *Quintals*[1]	Value *Zlotys*[2]	Quantity *Quintals*[1]	Value *Zlotys*[2]	Quantity *Quintals*[1]	Value *Zlotys*[2]
Tires	63	67	87	82	23,718	27,309	20,910	19,544
Footwear	112	176	11,716	10,127	7,469	16,101	4,422	8,617
Other	126	113	124	142	17,595	8,991	3,583	6,157
Total	301	356	11,927	10,351	48,782	52,401	28,915	34,318

[1]The metric quintal equals 220.46 pounds.
[2]The zloty equals $0.112.

The local production of tires is in its infancy, so the consumption will probably be met by foreign manufacturers for some time to come. Imports of all kinds of tires comprised 49 per cent of the total in 1928 and 72 per cent in 1929—but imports decreased from 2,371,800 kilos to 2,091,000 kilos in 1929. The imports of automobile casings and inner tubes remained fairly stable during 1928 and 1929—at 1,732,500 kilos and 1,682,900 kilos respectively—but the decided declines were in solid tires and miscellaneous pneumatic casings.

The United States during 1928 was the leading supplier for tires, with 48 per cent of the total imports. France was second, furnishing about 25 per cent, followed by the United Kingdom with approximately 15 per cent. Italy and Belgium exceeded Germany.

The preliminary figures for 1929 show that the United States remains the principal supplier, but has increased its participation to more than 53 per cent. The United Kingdom advanced its share to 35 per cent, but France has declined from 25 per cent in 1928 to about 12 per cent in 1929.

The large gain in production and exportation of rubber footwear has consequently reduced imports from 746,900

*Abstract from "Commerce Reports," U. S. Department of Commerce.

kilos in 1928 to 442,200 in 1929. The principal supplier of canvas rubber-soled shoes in 1928 was Sweden, followed by Czechoslovakia, while the leading foreign suppliers of the overshoe and galosh requirements were Latvia, Sweden, and Soveit Russia.

The preliminary figures for 1929 show that Poland finds its best markets for rubber footwear in countries which have already a well-developed rubber footwear industry. This indicates that Poland is able to produce a low-priced article sufficient, after the payment of custom duty and other charges, to compete in price with the domestic article.

Polish Exports of Rubber Footwear
[Kilos]

Country of Destination	Canvas rubber-soled shoes			Galoshes	
	[1]1926	1927	1928	1927	1928
United Kingdom	46,600	100	100	([2])	([2])
Austria	([2])	([2])	400	([2])	([2])
Denmark	13,100	100	1,500	500	([2])
Germany	11,500	100	400	([2])	3,000
Sweden	6,000	([2])	100	([2])	([2])
Soviet Russia	4,900	600	([2])	600	([2])
Rumania	39,600	2,400	([2])	([2])	([2])
Hungary	1,300	1,100	([2])	([2])	([2])
Latvia	([2])	([2])	([2])	([2])	2,800
Other countries	57,900	5,100	2,000	1,000	900
Total	180,900	8,500	4,500	2,100	6,700

[1]Includes all kinds of rubber footwear. [2]If any, included with other countries.

Besides the increased imports of crude rubber, Poland continues to buy added quantities of waste and reclaimed rubber, vulcanized rubber in bulk and hard rubber for fabrication into the finished product. The highly developed German and British industries for the vulcanization of crude rubber and the regeneration of old rubber provide excellent sources for the Polish industry, but imports from the United States are also increasing.

Rubber in Shoe Quarter-Linings

THE E. I. duPont de Nemours & Company have recently perfected a new rubberized material for shoe quarter-linings which they are marketing under the name of Pontan.

Coated textiles have become increasingly more practical for use in shoes because of newer developments and improvements that have made it possible to build into them the essential characteristics of a shoe constituent.

Newer developments in rubber-coated fabrics in particular have yielded certain products that are admirably suited to certain definite uses in the shoe industry.

Pontan is built of a specially constructed fabric which had not previously been used by rubber manufacturers to any great extent. To this fabric base a special rubber coating is applied in such a manner as to give it properties resembling leather. Because of its special construction the coating has excellent wearing qualities and the tendency to peel is practically eliminated.

Pontan, generally speaking, looks like leather to the casual observer. It is made in similar colors and has a slightly fibrous surface not unlike some leather. When wrinkled or crushed, it takes on an even more leather-like appearance due to the grain-like creasing that develops. This quality of appearance is of prime importance, for a quarter-lining material must look like leather in order to be practical for use in shoes.

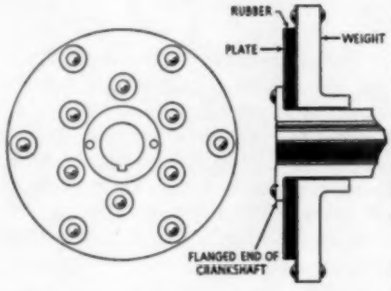
Du Pont Pontan does not have the elasticity or the resiliency of an ordinary rubberized fabric which would cause it to spring away from the counter after pasting. On the contrary, it has a plastic quality which tends to make it stay smoothly in place. Pontan cuts with a die or knife and machine trims efficiently, giving a desirable, smooth, non-raveling edge. In fact, it seems to comprise every important essential quality for workability in which a shoe operator might be interested. The appearance and wearing qualities of this material insure comfort and satisfaction to the user.

Du Pont Pontan is being manufactured at the Fairfield, Conn., plant of The Du Pont Company.

Rubber in Vibration Dampener

IN A new application of rubber as a vibration dampener recently developed in the research laboratories of the Chrysler Corporation, the reaction of weight rather than friction between discs of metal, is used to break up the periodic vibrations of the crankshaft. Because pistons and connecting rods drive against the crankshaft in an angular direction rather than vertically, each explosion or impulse tends to twist the shaft. This force and corresponding twisting effect are resisted by the rigidity of the shaft.

Regardless of how rigid the crankshaft may be, however, steel is an elastic substance, and this constant twisting effort causes it to be wound up to a slight degree, just like a spring. When the force is released, the shaft naturally springs back. The explosions and the resulting impulses of the connecting rods coming at regular intervals tend to increase the degree of distortion in the shaft in the same way that a column of men, marching in step across a suspension bridge, increase the sway of the bridge. If the oscillations or twisting of the crankshaft are frequent enough to become audible vibrations, or if they tune in with other mechanical operations, a vibration is set up that can be heard and felt throughout the car.



Dampeners are intended to prevent these vibrations before they are built up to annoying proportions. In the new Chrysler dampener, there is a heavy disc separated from a flange on the end of the crankshaft by a rubber unit of pre-determined characteristics. The flange on the end of the crankshaft and the face of the disc are both bonded by rubber so that they form an integral part.

The accompanying illustration shows the position of the rubber and a view of the face of the vibration dampener.

When the crankshaft tends to become distorted and springs back under the twisting impulses, the elastic rubber causes a relative movement to occur between the shaft and the heavy disc. The counter distortion set up in the rubber and the natural recoil of the disc due to the elasticity of the rubber, prevent any chance for synchronization of vibrations, and consequently dampen them before they become severe. It has been adopted universally by the Chrysler Corporation.

The Dunlop-Perdriau Company (Australia), in conjunction with the Cable Makers' Association, and Metal Manufacturers, Ltd., with a combined capital of over £23,000,000 ($115,000,000) is negotiating for the manufacture of insulated cable and wire in Australia. The rubber compound and sheet would be manufactured and supplied by the Dunlop-Perdriau Company, and the copper wire by Metal Manufacturers, Limited, from their existing plant at Port Kembla. The Australian trade in the sizes most required is estimated at between $2,000,000 and $2,500,000 per annum.

RUBBER-TEXTILE SYMPOSIUM

The Strength and Stretch of Double Texture Rubber Goods

By T. M. KNOWLAND

Boston Woven Hose and Rubber Company

RUBBER articles may be divided roughly into three classes: (1) pure gum, (2) hard rubber, and (3) various combinations of rubber and textile fibers. This latter class is the largest and possibly the most important of the group, and includes besides tires the bulk of mechanical goods, such as hose, belting and sheet goods of various kinds. Probably no combination of useful materials affords a wider range of possibilities than the various combinations of rubber and textile fibers.

In rubber-textile combinations the cotton fiber is ordinarily used to impart tensile strength and to decrease the stretchiness of the product, while the attempt is made to retain at the same time as much resiliency as possible. Most of these combinations are of laminated construction, consisting of alternate layers of rubber compound and woven fabric, the physical properties being controlled by the construction of the fabric and the composition and cure of the rubber compound. Since cotton is usually more expensive on a volume basis than rubber, it is desirable to obtain the maximum tensile properties of the cotton fiber and to restrict its use as much as possible. That this is a difficult matter may be recalled when we compare the actual bursting strength of various mechanical goods with the so-called theoretical or calculated strength based on the additive strengths of the plied up fabrics in the fabricated article; it is at once apparent that only a small proportion of the fiber strength is effectively employed.

The most important consideration in designing plied fabrics to meet definite tensile specifications is to maintain *stretch balance* in the various plies which go to make up the assembled article. Stretch balance means that the residual stretch in all plies of fabric is equal in any given direction. If this balance is maintained, every ply will do its share of work and should fail at the same instant if the plied fabric is stretched to the failure point. The stretch referred to is, of course, that of the plied fabric in the processed condition; stretch relationships in the grey goods condition have no significance, as changes in tensile-stretch properties take place during processing, curing, and because of contact with other plies in the finished article.

Automobile topping furnishes an interesting example of a plied fabric construction which is poorly designed to withstand actual service conditions. Plate 1 is a typical piece of two-ply auto topping which tests 150 lbs. total warp and 85 lbs. total weft as indicated. It may be concluded that since the weft is weaker than the warp it is more subject to failure in service, especially when subjected to the most common of injuries caused by pressure from a blunt instrument or by a blow. The reverse, however, is apparently true, and we can make use of the Mullen tester to illustrate the behavior of these types of fabrics in absorbing blows from blunt objects. When this type of fabric is placed in the Mullen tester and the pressure applied we obtain breaks in the topping fabric as shown in Plate 2. Four Mullen test pieces are shown. In the first one the diaphragm of the tester is just breaking through the warp. In the second sample the break has been further extended. The third sample shows the weft starting to tear, and in the fourth sample both warp and weft have completely failed. In spite of the fact that the warp is 75% stronger than the weft, it has broken first. The explanation of this effect is that the warp and weft do not take up the load evenly; the warp being compelled to take almost the entire load due to the stretchiness of the weft—consequently it has failed first, followed by the weft. The total warp stretch is 4% compared with a total weft stretch of 13.7%. Had both warp and weft been constructed with the same percentage stretch, they would have taken

PLATE 1

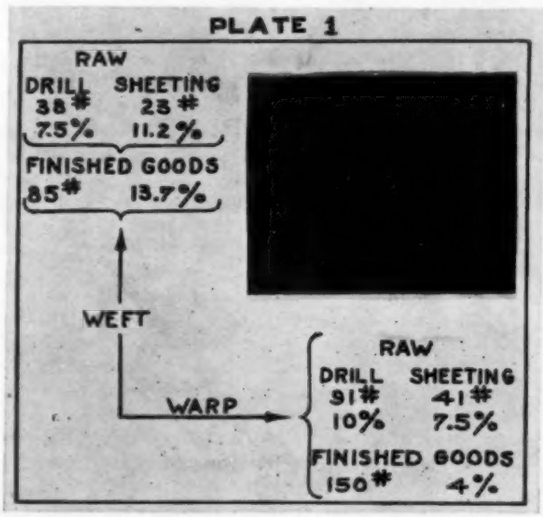
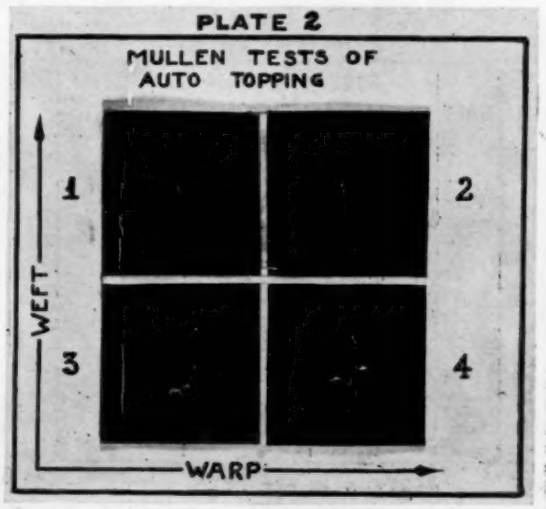


PLATE 2

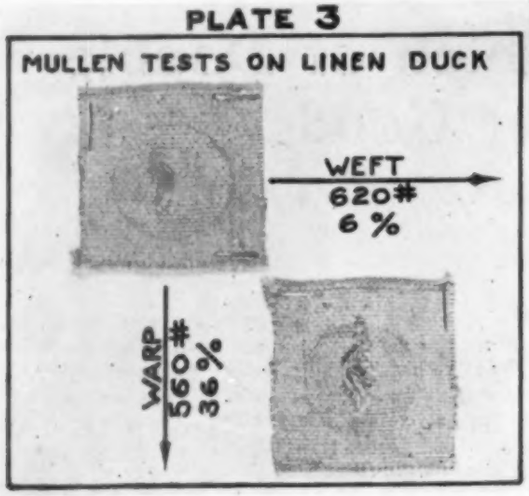


EDITOR'S NOTE: The two papers published in this issue of THE RUBBER AGE constitute part of a symposium on Rubber-Textile and were presented before the New York Group, Rubber Division, A. C. S., December 16, 1929. The first paper of the symposium, "Rubber-Fabric Combinations as Used in Rubber Footwear," by A. R. Arnold, appeared in the April 25 issue. The balance of the papers, completing the symposium, appeared in the May 10 issue. Reprints of this complete symposium will shortly be obtainable through the courtesy of the Binney and Smith Company.

up the load at the same rate and would have failed at the same time. The bursting strength would, therefore, have been greatly increased.

Plate 3 shows two Mullen test pieces of a very strong linen duck. Although the weft is stronger than the warp, it has failed in each case due to excessive stretch in the warp. Owing to the stretchiness of the warp, which is six-fold that of the weft, it never

PLATE 3

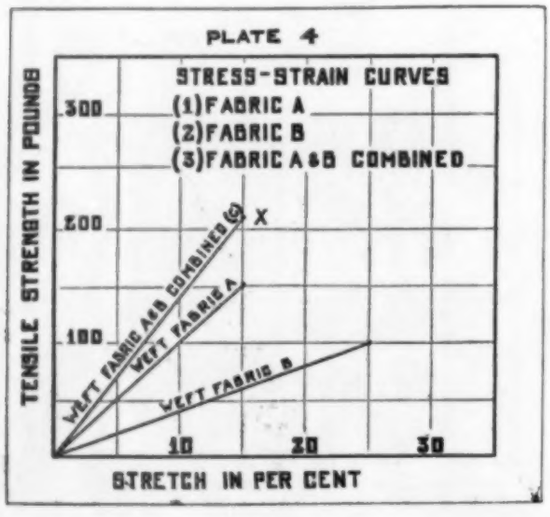


reaches more than a nominal load of perhaps 100 lbs. by the time the weft has reached a breaking stress of 630 pounds. Tests of this character cannot, of course, be indiscriminately applied to all types of plied goods as many types require a different stretch or strength in either warp or weft, depending on the service conditions encountered.

Theoretically it should be possible to calculate the strength of a plied fabric construction, provided the tensile-stress characteristics of each individual ply is definitely known, and to design these fabrics with some degree of rationality. In determining the stress-strain characteristic of each ply, a sufficient number of tests must be made to eliminate the great variability of results encountered in fabric testing. The stress-strain for each ply must be that of the processed and cured fabric, and for use in computation can be obtained by combining two plies of the same fabric with warp and weft parallel, curing, testing, and dividing the tensile by the factor 2. The rubber compound used between plies and its gauge should be identical with that of the finished product whose strength characteristics it is desired to calculate. Having determined the ultimate tensile-stretch figure for a fabric in both warp and weft direction, the modulus can be plotted from this figure, and for purposes of approximation can be plotted as a straight line.

Referring to Plate 4, lines A and B represent the weft moduli of two fabrics which are plied together to form a laminated construction. If this laminated sheet is stretched in the weft direction the total stress would be expected to equal the sum of the stresses in both fabrics as shown in line C. As the fabric is stretched the

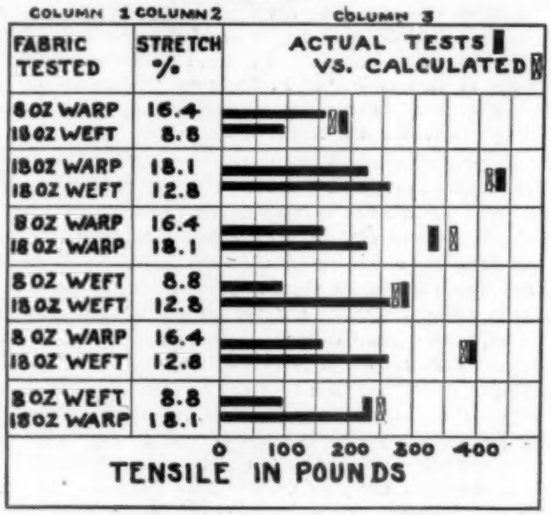
PLATE 4



total stress would increase until point X is reached when fabric A would fail. The stress would not thereafter attain the value reached at X and would, therefore, represent the ultimate weft strength of the plied fabric. In other words the strength of fabric "B" is never fully realized as the combined fabric breaks before "B" is fully stressed to its ultimate capacity. In connection with the testing of fabrics it should be noted that while laminated fabrics must fail ply by ply depending on the uniformity of stretch relationship, yet the time element between breaks is so short that it can seldom be detected, and failure usually occurs with suddenness.

In order to check the theory outlined above a series of two-ply rubberized fabrics were prepared and tested. The two fabrics chosen were an 8 oz. duck and 18 oz. duck and were selected to be widely different in tensile and stretch properties in both warp and weft. These were calendered, plied-up or doubled, and cured with the warp and weft of each oriented at a 90° angle to give varying test results. Plate 5 shows the different combinations of fabrics tested, and the actual tensile results compared with the calculated tensile strength. Column 1 shows the direction of ply yarns between testing machine jaws for each break recorded, i.e., in the first com-

PLATE 5



bination the 8 oz. warp and 8 oz. weft were combined in the same direction and tested in that direction. The second column shows the ultimate stretch percentage of each fabric in the combination when tested individually. In column three the horizontal lines, referred to in the scale below, show the actual tensile strength of each fabric when tested individually. The blocks in solid color show the actual laboratory tensile strength of the various combinations when plied up as shown and the blocks marked X show the calculated results as determined by the graphical method outlined in Plate #2. These results are in fair agreement and indicate that it should be possible, at least in the case of two ply combinations to calculate the tensile strength and to design such combinations with a better knowledge of their ultimate properties. In brief, the calculations are based on the assumption that when one fabric fails in a two ply combination, the ultimate strength of the combination is realized at that point. If, however, the ultimate strength of the remaining fabric is greater than the combined stress in the two plies at the time of failure of the first, then the strength of the combination is no greater than for the second fabric alone. This is shown in Plate 5 in the combination of the 8 oz. weft and 18 oz. warp. It will be further noted that the maximum tensile results are obtained where the best "stretch balance" occurs as in tests Nos. 2, 3 and 5. Disregarding questions of precision, these results demonstrate that it should be possible to design plied fabric compositions with a fair expectation of obtaining the maximum properties of the textiles employed. To accomplish this result plied fabric constructions should be designed so that each fabric has the same residual stretch in any given direction. Fabrics should be specified and purchased with these considerations in view.

Unfortunately fabrics are not always plied up at 90° to each other. It is absolutely essential to resort to bias cutting in order to obtain certain stretch characteristics in certain rubber-textile combinations. Fabrics of this character are often poorly designed,

PLATE 6

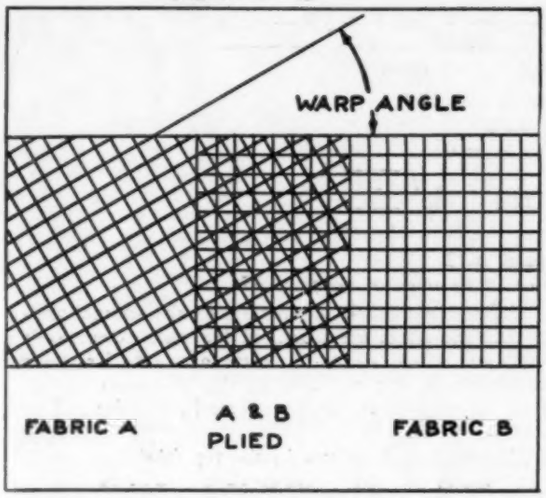
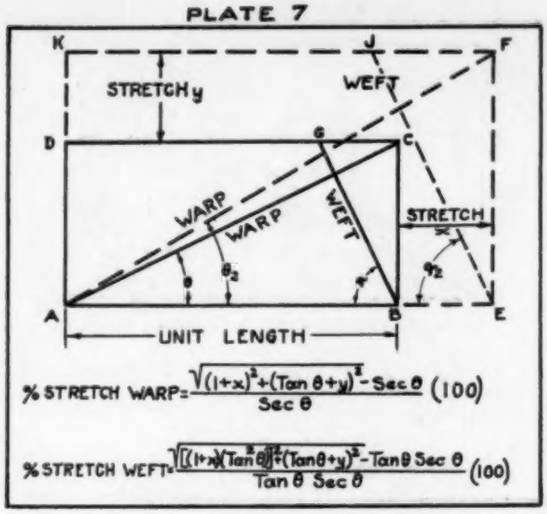


PLATE 7



fact are not designed at all. These articles frequently fail to et conditions of service and a vast quantity of cotton is wasted because its properties are never fully realized.

Plate 6 shows the construction relationship between bias cut rics when plied together to form a laminated construction. Fabric A is bias cut at about 30 degrees and is plied up with fabric B which is cut on the straight. For convenience we may call the angle which the warp of fabric A makes with the warp of fabric B the warp angle of the combination. When plied up fabrics of this character are stretched, a resulting stretch takes place in the warp and weft of both fabrics and certain readjustments in crimp take place which do not require consideration in this paper. Reference to Plate 7 indicates more clearly the changes which take place when a bias cut fabric is stretched. ABCD represents a section of fabric cut on a bias angle Θ. The section is so chosen that side AB is of unit length. If this fabric section is stretched X amount laterally and Y amount transversely, it will assume the proportions AEFK. The warp AC will stretch to the dimension AF as shown and the Weft BG will become BJ. Warp angle Θ changes to Θ^2 and a change also takes place in the fabric angle between warp and weft. The changes in length and stretch in warp AC and weft BG can readily be evaluated in terms of the original warp angle Θ and the lateral and transverse stretch, X and Y, for example

$AB = \text{unity} = 1$

$BC = \tan \Theta$

$AC = \sqrt{\tan^2 \Theta + 1} = \sec \Theta = \text{original warp length.}$

$AE = 1 + x$

$EF = \tan \Theta + y$

$AF = \sqrt{(1 + x)^2 + (\tan \Theta + y)^2}$

$$\text{Stretch in } AC = AF - AC = \sqrt{(1 + x)^2 + (\tan \Theta + y)^2} - \sec \Theta$$

$$\text{Therefore the \% stretch in warp } AC = \frac{\sqrt{(1 + x)^2 + (\tan \Theta + y)^2} - \sec \Theta}{\sec \Theta} (100) \quad \ldots\ldots (1)$$

In a similar manner the stretch in the weft BG follows:

$$\text{\% stretch in weft } BG = \frac{\sqrt{[(1 + x)(\tan^2 \Theta)]^2 + (\tan \Theta + y)^2} - \tan \Theta \sec \Theta}{\tan \Theta \sec \Theta} (100) \quad \ldots\ldots (2)$$

In cases where the warp angle is greater than 45° the solution requires slightly different treatment due to point G falling within line AD and results in the following:

$$\text{\% stretch in weft } BG = \frac{\sqrt{[(\cot^2 \Theta)(\tan \Theta + y)]^2 + (1 + x)^2} - \csc \Theta}{\csc \Theta} (100) \quad \ldots\ldots (3)$$

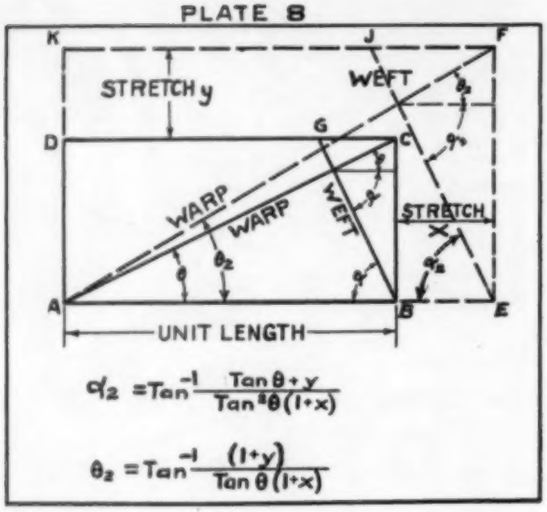
When fabrics are tested in the laboratory the separating action of the testing machine jaw stretches the fabric until its ultimate strength is reached and failure takes place. The term stretch as used here is intended to mean the total elongation of the threads due to stretch in the cotton fiber, slippage between fibers, loss in crimp, and twist effects in yarn, ply yarn and cable.

The lateral stretching of fabrics in the testing machine jaws is accompanied by transverse contraction and decrease in thickness which in general follows the equation: $(1 + x)(1 - y)^2 = 1$, where x is the elongation in percent and y the contraction percentage in both width and thickness. While an actual laboratory figure for each fabric investigated may be taken, for the purpose of approximation the above may be used. The transverse stretch y in the formulae proceeding, therefore, becomes $1 - \sqrt{\frac{1}{1+x}}$, the contraction being used as a negative stretch.

In cases where the fabric is placed in the testing machine jaws at an angle so that either warp or weft are at an acute angle or bias with the jaws, additional stretch in the fabric is permitted, due to change in angularity between warp and weft. When plied fabrics are tested in this manner, the stress required to produce failure should include that necessary to produce changes in angularity as well as that required for actual rupture of the fabric structure.

The stress necessary to produce a given change in angularity between warp and weft may be determined experimentally by stretching the fabric samples in the testing machine by the strip method and plotting the stress strain curve from the data obtained. The stress for a given deformation varies with the bias of the test sample with relation to the jaws of the testing machine, and is due

PLATE 8



partly to the inclusion of a variable number of ply yarns in the jaws when tested with a varying bias and partly to the fact that changes in angularity for a given jaw separation vary with the degree of bias of the sample.

The change in angularity between warp and weft which takes place on stretching bias cut samples may be calculated in terms of the lateral and transverse stretch (or contraction). Reference to Plate 8 shows the changes which take place in angularity as the fabric is stretched a distance x laterally and y transversely as indicated.

In all cases before stretching the angle between warp and weft in any woven fabric is 90° or angle β. After stretching as shown it alters to β_2 while the bias angle changs from Θ to Θ_2. Angle β_2 equals $\Theta_2 + \alpha_2$ which may be evaluated as follows:

$\Theta_2 = \tan^{-1}\text{EF}$

$$\frac{}{\text{AE}} = \tan^{-1}\frac{\tan\Theta + y}{1+x} \qquad \text{.....(4)}$$

Similarly

$\alpha_2 = \tan^{-1}\text{EF}$

$$\frac{}{\text{JF}} = \tan^{-1}\frac{\tan\Theta + y}{\tan^2\Theta\,(1+x)} \qquad \text{.....(5)}$$

It is assumed that the total amount of work necessary to change the fabric angularity is constant for a definite change in angularity, regardless of the bias angle at which the fabric is stretched, and varies only with the number of warp and weft thread crossings.

In order to check the foregoing calculations and the assumptions on which they were based, a series of two-ply fabrics were rubberized, plied up at different warp angles with each other, cured and tested. The same fabric was used in both top and bottom plies and was 21. oz. duck selected because of widely varying properties of both warp and weft. The following shows the physical properties of this duck when tested in the rubberized and cured conditions.

	Warp	*Weft*
1. Tensile strength	270 lbs.	317 lbs.
2. Ultimate stretch in percent	28%	16%
3. Modulus of elasticity.....	9.7	19.8

(Note: tests by grab method, 1" x 1" x 3")

In the experiments, five series of samples were prepared and tested as shown in Plate 9. At the same time the theoretical strengths were calculated and compared with the actual laboratory tests. The computations were carried out as shown below, and for exemplification, Sample 2 plied up at an angle of 30° is selected. In sample 2 the bottom fabric will be warpwise in the testing machine jaws and can, therefore, stretch 28% if permitted to do so by the top fabric, which lies at warp angle of 30° with the bottom fabric. The warp of the top fabric will obviously bear an extension of 28% in the direction shown, but the ultimate weft stretch of 16% will probably be the limiting factor, if any, in the extension of the test sample.

A. To calculate the stress in the warp of the bottom fabric which is stretched as shown in Plate 9, use formula (1).

$$\frac{\sqrt{(1+x)^2 + (\tan\Theta + y)^2} - \sec\Theta}{\sec\Theta}(100) = \%\ \text{stretch warp} \qquad (1)$$

where $x = 28\%$

$\Theta = 0$

$\tan\Theta = 0$

$$y = 1 - \sqrt{\frac{1}{1+x}}$$

$\sec\Theta = 1$

Mw = modulus of warp = 9.7

Since the bottom fabric is stretched on the straight the contraction y does not affect the length of the weft except as it affects the crimp and it will, therefore, be taken as zero for this case.

Substituting in (1) and solving, the % stretch = 28%. The stress in the warp of the bottom fabric is, therefore, 28 (M_w) = 28 (9.7) = 270 lbs.

B. To calculate the stress in the top fabric.

$\tan 30° = .577$ $\sin 30° = .5$ $x = .28$

$\sec 30° = 1.154$ $\cos 30° = .87$ $y = 1 - \sqrt{\frac{1}{1+x}}$

1. To calculate stress per inch width in top fabric warp.
   Substituting and solving in equation (1)
   % stretch warp of top fabric = 17.9%
   Stress per inch width of warp cross-section top fabric = 17.9 (M_w) = 17.9(9.7) = 174 lbs.
2. To calculate stress in weft top fabric.
   Substituting in equation (2)
   % stretch in weft of top fabric = —6.3%
   Therefore the weft shrinks and shares no part in the total stress; it represents wasted cotton.

The stress per inch width crossection of warp and weft must be recalculated to represent the stress per inch width of combined fabric perpendicular to the testing machine jaws. It can be shown that the stress in this direction Swf is as follows:

$$\text{Swf} = \text{Pw}\,\text{Cos}^2\,\Theta + \text{Pf}\,\sin^2\Theta \qquad \text{.....(6)}$$

where,

Pw = stress per inch width crossection of warp = 174 lbs.
Pf = stress per inch width crossection of weft = O
Θ = bias angle of cut.

Substituting and solving, Swf = 131 lbs.

Therefore the total stress in the combined fabrics due stretching but not due to changes in angularity is as follows:

1. Stress in bottom fabric.....270lbs. per inch width
2. Stress in top fabric.....131 lbs. per inch width

Total.....401 lbs. per inch width

3. To calculate the stress due to change in angularity between warp and weft in the top fabric.

PLATE # 9

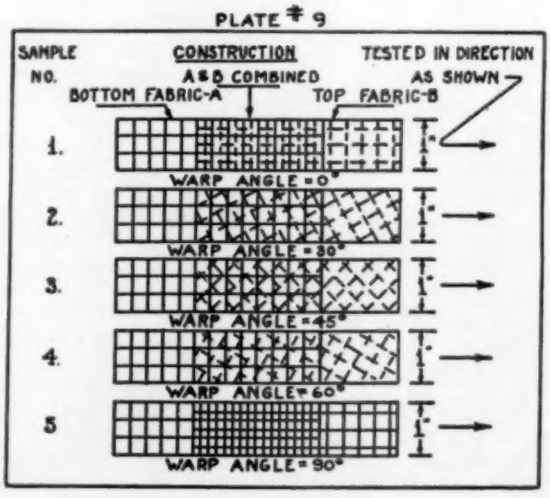
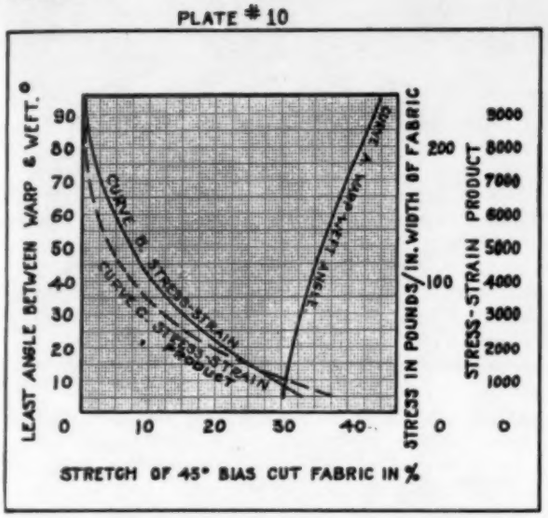


PLATE # 10



Reference to Plate 10 shows three curves. Curve A is an experimentally determined curve obtained by stretching a strip of the rubberized and cured fabric cut on a 45° bias and stretched to determine the distortion or change in angularity between warp and weft with relation to the percentage elongation of the strip. Curve B is the modulus obtained by stretching the strip and should represent the stress required to accomplish the changes in angularity between warp and weft. Actually it also includes the stress required to stretch the rubber in the combination as well as the small variable amount of stretch which may result in the fabric itself. In the low range of stretch required to effect relatively large angular changes the two latter effects may be neglected. It is further assumed that the work necessary to effect a given change in angularity is constant. Curve C is a stress-strain product curve desired from and plotted to correspond to Curve B. Since the angularity changes from 90° to Θ_2 to $\Theta_2 + a_2$ where

$$\Theta_2 = \tan^{-1}\frac{\tan\Theta + y}{1+x} = \tan^{-1}\ .357 = 19.6°$$

$$a_2 = \frac{\tan\Theta + y}{\tan^2\Theta\,(1+x)} = \tan^{-1}\ 1.075 = 47.1°$$

Total.....66.7°

So that the resulting acute angle between warp and weft changes from 90° to 66.7°. Referring to curve A, the elongation in percent on a 45° bias cut corresponding to a warp-weft angle of 66.7° is 31.5% stretch. Referring to curve C a stretch of 31.5% on 45° bias corresponds to 2200 work units, and since the fabric is actually stretched 28% at 30° bias the stress corresponding to the work done should approximate 79 lbs. The total stress in the sample at the point of failure should then approximate:

1. Stress in bottom fabric per inch width	270 lbs.
2. Stress in top fabric per inch width	131 lbs.
3. Stress in top fabric due to change in angularity	79 lbs.
Total stress at failure point	480 lbs.

Table No. 11 shows the laboratory test results obtained in comparison with the calculated results obtained as outlined above.

TABLE 11

	Warp angle of top to bottom fabric	Calculated tensile strength	Laboratory tensile strength
1.	0°	540*	540
2.	30°	480	510
3.	45°	487	525
4.	60°	470	526
5.	90°	472	440

*Laboratory results used as basis for subsequent calculations.

It is apparent from the foregoing conclusions that the specifications for rubber-textile combinations should receive more careful consideration with a view to obtaining the maximum properties of each ply through the use of approximate calculations to determine the probable strength and stretch. If it is asked why some fabrics are cut on the 45 degree bias instead of 46 or 47 degrees, a rational answer will not likely be obtained. It is obvious that the strength and stretch characteristics of certain classes of merchandise should be calculated approximately and the fabrics purchased on a stretch as well as a tensile strength basis. If this is done, the savings in cotton alone will be enormous and the quality of the various products will be correspondingly improved.

The Effect of Rubber Proofing Process on the Tensile Strength of Fabric

By **A. R. Lewis**

C. Kenyon Co., Brooklyn, N. Y.

THE variety of fabrics offered to the rubberproofing trade today is so great that a careful study of the effect of ths everal proofing processes on the tensile strength of the fabrics should require considerable time and effort. For the purposes of this paper, a careful analysis was made of the results of a group of control tensile strength tests on a representative group of samples. The tests were run only on uncoated fabrics and finished coated fabrics. Undoubtedly, considerable valuable information could be obtained from a series of tests performed on samples taken at intermediate stages of processing, but unfortunately, but little of this information was available.

Most of the common types of fabric in use today are offered to the rubberizer including several kinds of yarns; cotton, silk, wool, and rayon and numerous varieties of weaving; sheeting, drill, twill, sateen, and moleskin, with design effects produced by printing, embossing or fancy weaves. During the past year, knitted fabrics for the raincoat trade have come into prominence with added complications in the matter of tensile strength tests and of other specifications. All of them were not suitable for the tests reported in this study.

The uses to which rubberized fabrics are put are so varied that it is not possible to assume that specifications can be uniform in the matter of tensile strength. For some purposes it is not necessary that the strength in the filler direction be equal to the warp, but in the majority of cases the strain on a fabric is probably nearly equal in the two directions. Most of the fabrics tested were decidedly stronger in the warp than in the filler. Rubberizing increases the tensile strength in both directions, but to a degree which varies considerably, depending upon a large number of variable factors. In almost all cases the percent increase is greater in the filler than in the warp, but still the final strength is greater in the warp than in the filler. Some of the variable factors which effect

the degree of increase are: type of weave (sheeting, drill, etc.), method of coating (spread, impregnated, etc.), twist or tightness of the yarn, and relation between the weight and count of the fabric, and the quality of dyeing in the case of dyed goods.

When a tensile strength determination is made on an uncoated fabric there are two chief factors which tend to resist the breaking of the fabric, one is the strength of the fibres themselves and the other is the surface friction of the fibres tending to prevent adjacent fibres from moving in opposite directions as the fabric breaks. In a coated fabric one additional factor of importance is added which is the cementing action of the coating which tends to prevent adjacent yarns from moving in opposite directions when they do not break at the same point. From this the explanation of the cause of an increase in tensile strength due to the rubber coating is simple. Either the rubber increases the adhesion of fibres to one another in the yarn and increases the adhesion between the threads or it entirely prevents the fibres or threads from sliding over one another in opposite directions, and causes a straight line break which is more nearly the strength of the composite of all fibres at the point of rupture. It is easy to see, therefore, that any proofing process which tends to increase the penetration of the coating compound into the yarn or which tends to cause the coating to adhere more tightly to the surface of the fibres or yarn will increase the tensile strength of the fabric proportionately.

The tensile strength determinations upon which these observations were based were made by the A. S. T. M. grab method of a Scott Machine, except that the jaws separated at a speed of 20 inches per minute instead of 12 inches per minute as specified Humidity conditions could not be controlled and no corrections were made for humidity. All of the tests on each fabric, both coated and uncoated, were run on the same day.

The following table gives a composite comparison of the tests which were run:

Comparison of Tests

	Uncoated		*Coated*		*% Gain*	
	Warp	*Filler*	*Warp*	*Filler*	*Warp*	*Filler*
1. Lt. Sheeting, undyed	41.1	32.6	57.2	49.0	39.9	51.9
2. Lt. Sheeting, dyed	43.2	24.7	46.5	31.7	7.8	28.5
3. Heavy Sheeting, undyed	78.3	74.3	86.3	87.6	10.4	16.5
4. Duck, double coated	130.0	55.8	152.6	72.2	17.4	29.4
5. Duck, single coated	130.0	55.8	146.2	68.8	12.4	23.3
6. Drill, undyed	87.8	35.4	101.8	65.4	16.0	70.6
7. Single Nap, flannel-dyed	28.1	25.3	39.8	38.8	39.1	53.5
8. Same, 1 spreader coat	25.3	24.9	25.9	34.8	2.4	39.7
9. Double Nap Flannel Impreg.	33.1	28.8	62.0	87.2	87.3	202.3
10. Same, spread coating	33.1	28.8	38.5	26.8	16.2	11.5
11. Embossed Moire Rayon	71.5	75.2	70.3	83.6	—1.7	11.2
12. Check Embossed Rayon	21.8	43.4	26.3	45.7	20.3	5.3
13. Fancy Weave Rayon	25.6	28.6	39.2	33.8	52.8	18.2
14. Printed Rayon	23.7	36.5	26.2	60.3	10.7	65.2
15. Rayon Taffeta	54.6	48.9	70.2	55.9	28.5	14.3
Highest individual					87.3	202.3
Lowest individual					6.3	4.5

The first item in the table represents the average of a group of light weight sheeting samples run with various types of proofing. The samples vary in weight from three to five ounces per square yard, and are of medium count, running around 64 warp threads and 60 filler threads per inch. Some of the pieces were spreader coated and some were calendered, some were acid cured, some steam cured, and some were heater cured. All were double coated and the fabrics were undyed. The third item in the table is a comparable group of heavier, lower count sheetings. These weigh 5.75 to 5.85 ounces per square yard and run about 44 warp and 48 filler threads per inch. Here again all samples were double coated, some were spread and some calendered, and the same three different methods of vulcanization were represented. This group included samples from the three plys of an offset printers blanket. The fabric used for this purpose is comparable with the others in this group in weight and coat, but of considerably higher tensile strength. A comparison of the results obtained in these two groups indicates that the first group shows a greater percentage increase in tensile strength than the second group. This can be explained from our previously mentioned conception of the reasons for coating increasing the tensile strength of the fabric. The lighter fabrics are made from softer yarns which are more easily penetrated by the coating, and the higher count means that there are more adjacent surfaces of yarns which the coating tends to cement together. Another interesting fact disclosed is that the heavier sheetings are more satisfactorily constructed than the lighter ones. The tensile strength in both directions is more nearly equal, especially after coating. The tests from which these two group averages were obtained did not indicate that the method of vulcanization had much effect on the tensile strength, nor did they indicate that there was much difference between the spreader and calender methods of coating. In the first group there were also some calender frictioned samples which showed no outstanding improvement. The quality of the coating compound, also, did not appear to have much influence. It is felt, however, that the matter of the penetration of a yarn should be affected by these factors, and that a more comprehensive study would bring out some differences.

The second item in the table represents the results obtained from samples of dyed sheeting coated on one side on the calender and heater cured. The lesser percentage increase in tensile strength in this case represents the combined effect of coating only one side of the fabric and the effect of heater cure on a fabric not too carefully dyed.

Items four and five in the table are the results of tests run on undyed duck coated on the calender. One spreader coat was applied to only one surface of the fabric in each case but one group was calendered only on one side and the other on both sides. The results show that coating both sides of the fabric increase the tensile strength more than coating only one side. The samples also represent a fabric which could not be considered satisfactory for general purposes on account of the great difference in strength in the two directions. The percentage increase is in fairly close agreement with the results obtained on the heavy sheetings.

Item six shows the results obtained on samples of undyed drill coated on the customary side by the calendering process. The exceptionally large increase in the filler direction is a result of two factors, the soft twist in the filler threads and the predominance of the filler on the coating surface because of the nature of the weave. If samples were available with the face surface coated it is reasonable to predict that the percentage increase would be more nearly equal in both directions as the effect of the soft filler would still be apparent while the face surface would offer a predominance of warp threads. This fabric also is incorrectly designed for most uses to which it is put because of the differences in tensile strength.

Items seven and eight are the results of tests on dyed single napped flannel samples and show the effect of one spread coat followed by calender coating, both of the unnapped surface. These samples were heater cured except that item eight shows the condition of the fabric at an intermediate stage in the processing, samples having been cut immdiately after the spreader coat. Included with the results in item seven are some tests on spreader coating and liquor cure which ar in agreement with the other samples, and are averaged with them. The results indicate a rather well balanced fabric.

The greater increase in the strength of the filler, due to its soft twist, gives a resulting tensile strength nearly equal in both directions. The effect of one spreader coat on the filler strength is rather surprising.

Item nine shows the extreme increase in tensile strength which is caused by impregnating an undyed, double napped, soft filled sheeting with a rubber cement. As would be expected, the increase is greatest in the filler. These samples received additional spreader coating after the impregnation process, but the exceptional increase in strength is undoubtedly due to the greater penetration of the yarn by this process. Item ten shows correspondingly lower results which were obtained when the same fabric was spread on one surface. The napped surface prevented penetration of the yarn by the coating.

The last five items in the table show some very interesting results which were obtained in tests on spreader coated rayons. Items eleven and twelve were heater cured and the remainder were vapor cured. Item fifteen is a fabric composed of both warp and filler rayon yarns and the other four have cotton yarns for warp and rayon yarns for filler. From the smooth nature of rayon fibres and yarn one would predict that coating with rubber would not greatly increase the strength of rayon fabrics in the direction of the rayon. The results appear to be in fair agreement with this prediction, but a further explanation of the construction of these fabrics is necessary to make this point clear. The decrease in strength of the warp in item eleven is probably the effect of improper dying as this was a heater cured sample. The abnormally high results in the warp on item thirteen are explained by the nature of the weave. This material had a fancy design which was produced

by causing the shuttle to follow a certain prearranged schedule of skipping the warp threads. This caused a design in rayon filler yarn on one surface or the fabric and a corresponding design in cotton warp yarns on the other surface. The latter surface is the one which was coated. The greater exposure of the warp yarn permitted greater penetration and consequently greater increase in warp strength. The explanation offered for the reversal in effect in the case of the printed fabric, item fourteen, is that the printing serves to alter the surface of the rayon yarn so that adhesion of the coating and fibres is increased while the printing on the cotton yarn serves to prevent the penetration of the coating. The explanation of the slightly greater increase caused in the warp in the last item also comes from a study of the weave. This fabric also had a weave design which showed in the warp threads on the side which was coated. The chief use to which rayon fabrics are put today is for shower curtain material. For this use tensile requirements are not severe, so a more careful study is hardly warranted.

It is sufficient to know that the fabric is not injured by the proofing processes. Rayon fabrics on which a moire pattern is applied by embossing have to be watched carefully as they are sometimes seriously injured in strength by this operation.

The results indicate that fabrics for rubberizing should be carefully selected for the use for which they are intended, and that considerable improvement could be made in some constructions by the cotton mills.

New York and Akron Chemists Meet

(*Continued from page* 189)

A great number of slides were presented showing the wind resistance of various size tires and types of running gear as well as the effects of toe-in angles and stream lining of tire equipment on this wind resistance. A great number of slides were also presented showing different types of planes carrying different types of running gear.

Cleaning Rubber by the Strainer Method

J. P. MAIDER, *Goodyear Tire and Rubber Company*

This paper dealt with the relative merits of straining and washing rubber and also curves on which the relation of speed to horse power consumption and temperature of rubber were shown.

Field Application and Cure of Rubber Lining to Ball Mill

F. L. HAUSHALTER, *B. F. Goodrich Company*

Presented an interesting paper in which he explained and showed by charts how his company lined a large Ball Mill which was installed away from their own factory. He explained how some of the problems met with in field work were very ingeniously overcome.

Heliozone

HELIOZONE, the new preventative against sun checking of rubber, recently developed by E. I. du Pont de Nemours & Company, is a light green compound of a waxy nature, which melts at approximately 67°C. This is, of course, below the normal milling temperature and Heliozone, therefore, melts on the mill. It goes into the rubber easily and disperses completely. Although Heliozone is light green in color it does not impart any color to white or light colored stocks that contain it.

The function of Heliozone is to protect rubber against sun checking. It affords this protection by blooming to the surface after cure, forming a continuous plastic film which cannot be scraped off. The protective film is invisible to the eye and retains its plasticity at temperatures as low as zero Farenheit. The film does not dissolve in the rubber and disappear at high temperatures. Hence, it is claimed, Heliozone affords protection against sun checking in both summer and winter. For maximum protection the du Pont Company recommends using 2% of Heliozone, based on the rubber content of the stock. In most cases, satisfactory protection against sun checking is said to be obtained by using only ½% of Heliozone based on the rubber content.

Heliozone is not an antioxidant in any sense of the word and it is advised that a good antioxidant be used in addition to Heliozone.

Heliozone may be added to the rubber at any time during the mixing. It is generally most convenient to add it immediately after the breakdown.

Italian Rubber Trade in 1929

THE Italian rubber trade for 1929 showed practically no improvement over 1928, according to reports of the U. S. Department of Commerce. Imports increased in value by 9 per cent, while exports decreased 2 per cent, and the favorable balance of trade in rubber products during the past year fell off by nearly $1,000,000—to $7,870,500. During 1925 Italy was able to declare a favorable balance of trade in rubber products to the extent of $12,776,200, but since then it has been declining.

Value of Italian Trade in Rubber Products

	Imports	*Exports*	*Surplus of Exports Over Imports*
1924	$3,048,500	$11,255,000	$8,206,500
1925	3,815,000	16,591,200	12,776,200
1926	3,681,300	15,303,200	11,621,900
1927	4,692,100	14,343,200	9,651,100
1928	4,871,500	13,420,700	8,549,200
1929	5,305,800	13,176,300	7,870,500

This trend presents two well-defined factors: The increasing imports demonstrate that foreign nations are gaining a greater foothold upon the Italian consumption of rubber goods, and the decreasing exports show that Italy is becoming less and less a competitor in international trade.

Outstanding Events in 1929 Trade

The year 1929 showed no outstanding events except perhaps in the trade of rubber footwear, imports of which increased by 122 per cent—indicating that consumption within the country is increasing at a great rate. On the other hand, exports advanced by 90 per cent. Inasmuch as production statistics of rubber footwear are unavailable, definite conclusions can not be drawn. By the increasing imports one would infer that the domestic industry is unable to fulfill local requirements, but the increasing exports offset this theory to a certain extent.

The Italian industry revolves quite closely around the Pirelli organization of Milan, with numerous branch factories throughout the Kingdom. Furthermore, Pirelli maintains subsidiaries in Great Britain, Spain, Argentina, and Brazil, and various depots at other strategic trade centers. The concern is a large manufacturer of solid and pneumatic tires, mechanical rubber goods, cables and wires, floor covering, and other rubber articles. During 1929 a net profit of $1,440,700 was announced by the Italian organization.

Another name closely connected with the Italian rubber industry is that of Michelin, but this name generally reflects the parent organization in France. The Italian plant at Turin, however, is responsible for 80 per cent of the total tire exports from the Kingdom.

Extra copies of the Index to Volume 26 of THE RUBBER AGE may be secured upon request. It was printed as Section II of the April 10th issue.

EDITORIAL COMMENT

Sunshine Through the Clouds

IT is pleasing to note that even in the face of record low prices and an adverse statistical position from the standpoint of the rubber producer, the leaders of the industry in Great Britain are taking a farsighted and optimistic view of the situation for the future. After outlining the situation as of today, H. J. Welsh, chairman of the Plantation Investment Trust, in his speech to his stockholders, is quoted as saying:

"I have endeavored honestly to place before you the adverse factors affecting the rubber producing industry. But lest they should seem depressing, I should like to add that, taking a view covering, say, five to ten years ahead, I am optimistic as to the future of the industry, with or without any further restriction schemes, and in its ability over such a period of giving fair average returns in dividends. I believe that, fortunately, owing to the increasing consumption, our present troubles are only temporary, and that before long the growing demand for rubber will again overtake the supply.

"The world-absorption of crude during the seven years since 1922 has increased by 100 per cent. It is still increasing, and I believe that within ten years the world-absorption of plantation rubber will be double that of 1929. The supplies will, of course, also increase; but, in my opinion, they are not likely to increase, taking an average over the years, at so rapid a rate as the demand."

Sir Harold Snagge, presiding at the recent annual meeting in London of the Malakoff Rubber Estates, also took an optimistic view of the future, and while agreeing that the world was experiencing a serious slump, made the encouraging comment that "slumps, like booms, do not last forever." Sir Harold made a shrewd point when he added that if all the time and thought which for years were devoted to limiting supplies of rubber had been applied to promoting demand, the industry would have been farther along the road by now. He expressed the conviction that salvation lay in a greater use of rubber. He felt that the present low prices were not too disturbing and that they might not only prove an effective stimulus to greater efficiency but result in more sound economics.

And so, there is sunshine through the clouds now hanging over the plantation industry.

Industrial Statistics

THE Census of Manufactures is under way and the Federal Government has asked the support of all industries in its compilation. The Government deserves the fullest cooperation in this instance.

To what use can the Census of Manufactures be put?

This question is often raised by even successful business executives. The mass of statistical tabulations are uninviting to say the least; an Englishman described them as "ghastly." But these "cold figures" have a world of significance and many potentialities when studied and applied to business activities. And in a general way the Census of Manufactures figures are being increasingly used in this way in the business world of today.

Business men have become accustomed to consulting reports of the Manufactures Census if they desire information on the growth of manufacturing in this country as a whole or with regard to the prosperity of individual industries. The Federal Government has been collecting this information since 1849, and its statistics on industrial growth are equalled by no other country.

Though the uses of the Census of Manufactures figures are almost limitless, there are at least three substantial uses to which they can be put: (1) they reveal movements of industry throughout the country by disclosing new centers of manufacturing and relative decrease in the importance of already established centers, together with facts bearing upon the geographical location of individual industries and changes therein; (2) they provide individual communities with facts pertaining to industrial growth or recession in their communities; (3) they provide data of value in making market surveys.

This information is of utmost importance in studies concerning plant location; industrial markets; sources of equipment and materials; seasonal fluctuating in business; outlets for new products; competition; and business methods generally. In fact, in the hands of a skillful statistical analyst, the census figures will reveal accurately and completely information which can be obtained in no other way.

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Representatives in all the rubber centers of the United States, Canada, England, France, Germany and the Middle East.

The Rubber Industry's CURRENT NEWS

Financial—Personals—New Rubber Products—
Building Operations—Manufacturing—Exports

MICHELIN WILL REOPEN WHEN SITUATION IMPROVES

The factory of the Michelin Tire Company at Milltown, N. J., was closed down on April 24, affecting several hundred workers. J. Hauvette Michelin, vice-president and general manager, has asserted, however, that reports to the effect that the plant will not be reopened are untrue and that operations will be resumed as soon as conditions in the industry show an improvement.

It is understood that the company has shipped one of its old calenders to its factory in Germany and another to France and that a new four-cylinder calender to handle the new style of "weftless" tire fabric will be installed. H. M. Laloux, of the French Michelin company's engineering department, is superintending the changes.

Kleinert Buys German Plant

The Masonia Rubber Works, Hamburg, Germany, one of the largest European manufacturing plants for fine sponge rubber, has been purchased by the I. B. Kleinert Rubber Company, New York City. The purchase of the plant at Hamburg gives the Kleinert company two factories in Europe, the other being located in Paris.

Millionth Tire at Gadsden

The factory of the Goodyear Tire & Rubber Company at Gadsden, Ala., turned out its 1,000,000th tire on May 7, with Mayor W. E. Weir of Gadsden and other city and factory officials present for special ceremonies. The first tire was turned out at the Goodyear southern factory on June 21, 1929, and 5,000 tires are now being produced daily.

Henry L. Hotchkiss

Henry L. Hotchkiss, former president and treasurer of L. Candee & Company, died suddenly on May 3 while watching the Yale-Columbia boat race in Connecticut. Until his retirement last July, he had been a director of the United States Rubber Company.

Navy's New Dirigible To Be Named Akron

The first of the United States Navy's two giant dirigibles, now being constructed at the plant of the Goodyear-Zeppelin Corporation, is to be named the Akron. It is expected that the airship will be completed by the summer of 1931.

Ernest Lee Jahncke, assistant secretary of the Navy, declared on May 13 that in a conference with Secretary Charles F. Adams and Rear Admiral William Moffett, it had been decided that the new ship would be named for the city in which it is being built.

A fire on May 13 caused considerable damage to the plant of the National Aniline & Chemical Company at Buffalo, N. Y. The loss is estimated at $10,000.

LINEAR PACKING MOVES INTO ITS NEW FACTORY

The Linear Packing & Rubber Company has moved its factory and general offices from Marshall and Berks Streets, Philadelphia, Pa., to State Road and Levick Street. This new plant is located at the plaza of the Tacony-Palmyra Bridge at Tacony, Philadelphia, and is on the main line of the New York Division of the Pennsylvania Railroad.

The factory supplements the rubber mill recently acquired by the organization and enables production of the entire line from raw to finished products to be carried on in one unit. The new rubber mill added 10,000 square feet of production space to the company's units.

Established in 1898, the Linear Company is one of the oldest packing manufacturing firms in the country. For five years prior to 1927 there was a marked increase in the volume of rubber and duck-packing distribution, causing the firm to change its name from the Linear Packing & Manufacturing Company, as it was previously known.

The company's products include rubber rod packings, rubber sheet packings, and molded rubber items, in addition to which it does milling and calendering for the trade. The officers include A. A. Stevenson, chairman of the board; A. W. Swartz, president; Frank Mayo, vice-president; and William C. Fisler, secretary-treasurer.

$200,000 FIRE SWEEPS SPALDING BALL FACTORY

Destruction of the three-story refinery building of the A. G. Spalding & Bros. sporting goods manufacturing plant, which housed 8,000 gallons of naphtha and 2,000 gallons of acetol, used as solvents in the manufacture of golf balls, threatened the entire plant May 13, and caused a loss estimated at between $150,000 and $200,000 and indirect loss through curtailment of production that will be far heavier.

The entire city fire department was called out, but its effectiveness was handicapped by the intense heat and danger of serious explosions that prevented the firemen from getting at close grips with the flames.

After the refinery building had been blaznig for some time, one of the walls collapsed and a large quantity of blazing naphtha flowed onto the surface of the Chicopee River, which runs adjacent to the building. The burning naphtha quickly spread but a speedy concentration of hose lines extinguished it before it could set fire to a nearby covered wooden bridge that spans the river.

An added element of danger was the presence of three underground tanks, each containing 10,000 gallons of naphtha. Immediately after the fire broke out all of the several hundred employees were ordered out of the factory. An official said that the fire came at a season when the plant is especially busy.

To Continue Reference Service

The Smith and Smith Reference Service on rubber technology will be continued in its usual form despite the fact that Dr. Julian F. Smith has retired to accept a research position with the Du Pont Ammonia Company. Robert P. Hall, well known in rubber circles, will be in active charge of the service, while Dr. Smith will be retained in an advisory capacity. The services will be issued in the future from 313 South High Street, Akron, O.

Converse Yacht Is Scrapped

Sarah Bernhardt's famous yacht *Penlope*, once owned by the late Harry E. Converse, former president of the Converse Rubber Shoe Company, the Boston Rubber Shoe Company and other companies, has been consigned to the scrap heap at Green's shipyard, Chelsea, Mass. It was known in its later days as the U. S. S. *Yankton*.

GOODYEAR FABRIC MILL SETS PRODUCTION MARK

On April 22, the fabric plant of the Goodyear Textile Mills Company, subsidiary of the Goodyear Tire & Rubber Company of California, produced the 50,000,000th pound of fabric since its start of operations on August 14, 1920. In commenting on the record, P. W. Beggs, superintendent of the Los Angeles plant, stated that the mill is operated in three shifts, has 500 employees, with a yearly payroll of over $600,000.

The amount of fabric produced in the past ten years measured 34,000,000 yards and required a total consumption of 112,000 bales of cotton. Of the cotton that was used, fully 94 per cent was grown in the southwest, a large part being produced on Goodyear's own plantation in Arizona.

Largest Conveyor Belt

The largest conveyor belt ever constructed has been installed by the United States Rubber Company at the plant of the Michigan Limestone & Chemical Company, Rogers City, Mich. Its net weight is 50,655 pounds, slightly over 25 tons, and its length is 1,540 feet. Because if its size, the belt was shipped in three sections, which were joined together by vulcanization at Rogers City. While not quite so long as the 20-ton belt made by the same company for the Butler Consolidated Coal Company, Wildwood, Pa., last August, it is heavier and larger because of its being made of 42-ounce duck in a 13 by 15 ply thickness. The other belt, 1,682 feet long, was of 36-ounce duck in 12 ply thickness.

Names Advertising Agent

The Rubber & Celluloid Products Company, Newark, N. J., manufacturer of Rubberset tooth brushes, shaving brushes and paint brushes, has appointed the United Advertising Agency, New York City, to handle its advertising. The company's products are manufactured by its subsidiary, the Rubberset Company.

Goodyear Makes Record Awards

Employes of the Goodyear Tire & Rubber Company won $1,915 in suggestion awards during the first week of April, the largest award list in the history of the plant. Three employes won $500 awards, two of the winners working in the same department.

CATALPO
for
Inner Tubes

Abram M. Sawyer

Abram M. Sawyer, associated with the Vulcanized Rubber Company, Morrisville, Pa., for 42 years, died at his home May 6 after a short illness. Mr. Sawyer, who was 68 years old, was superintendent of the company 20 years, general manager 15 years, and a member of the board of directors. He was a recognized authority on all phases of the hard rubber industry.

Frank B. Wiborg

Frank B. Wiborg, former vice-president of the Ault & Wiborg Company, manufacturer of printing inks and rubber colors, died of pneumonia on May 12 at his home, 756 Park Avenue, New York City. Mr. Wiborg, who was 75 years old, was graduated from the Chickering Institute in 1874 and, after a few years as a salesman, joined the late Levi Addison Ault, then employed by a lampblack firm, in forming the Ault & Wiborg Company. His death closely follows that of Mr. Ault, who passed away on February 6.

New United Carbon Well

The recent completion of a well in the northeastern part of Moore County, in the Texas Panhandle, has added to the potential gas reserves of the United Carbon Company in the area. The well produced initially at the rate of 80,000,000 cubic feet of gas a day and 125 barrels of oil. The company now has a total controlled gas acreage of 151,000, chiefly located in Louisiana, Kentucy and West Virginia.

Pay General Dividends

The regular quarterly dividend of $1 a share on the common stock of the General Tire & Rubber Company was paid on May 1 to stockholders of record as of April 17. This is the 51st consecutive dividend on the common stock of the General Tire & Rubber Company, which has never failed since its organization in 1915 to pay regular cash dividends on both classes of its stock.

Thermoid Earned $1,051,454

The complete report of the Thermoid Company, Trenton, N. J., and subsidiaries for the year ended December 31, 1929, after giving effect to the estimated proportionate amounts of Southern Asbestos Company's earnings applicable to the varying percentages of ownership prevailing during the period, shows a profit of $1,051,454 after depreciation, interest, etc., but before federal taxes. Net sales for the year were $6,775,450.

N. J. Zinc Net Lower

The New Jersey Zinc Company has reported for the quarter ended March 31, 1930, net income of $1,671,867 after taxes, depreciations, depletion, contingencies, etc., equivalent to 75 cents a share on 1,963,264 shares of stock. This compares with $2,026,934 in the first quarter of 1929, or $1.03 a share on the same number of shares.

UNITED CARBON BUILDS NEW TEST LABORATORY

The United Carbon Company is constructing a new testing laboratory at Charleston, W. Va., at a cost of approximately $40,000, including equipment. The building is to be one story in height and 42 by 80 feet in size. The company's laboratory equipment will also be augmented shortly by the installation of small control laboratories at the several plants in Louisiana and Texas.

The United Carbon Company recently reported for the quarter ended March 31 net profit of $263,300 after depreciation, depletion and federal taxes, equal under the participating provisions of the shares to $3.82 a share on 21,069 shares of $100 par value participating preferred stock outstanding at the end of the quarter and to 46 cents a share on 393,073 no-par shares of common stock. This compares with earnings of $235,369 in the preceding quarter and with $412,886 in the first quarter of 1929.

Columbian Carbon Net Lower

The Columbian Carbon Company and subsidiaries have reported for the quarter ended March 31 a net income of $810,005 after depreciation, depletion and federal taxes, equal to $1.62 a share on 498,505 shares of no-par stock. This compares with $1,059,957, or $2.32 a share on 457,344 shares of stock, in the first quarter of 1929. The Columbian Carbon Company is one of the largest carbon black producers for the rubber industry.

Rubber Stocks Are Quiet

Together with the rest of the market, securities of the leading rubber companies have been inactive and have shown little change during the past fortnight. General Tire & Rubber common dropped to a new low of 135 at the close, but other issues held steadily within a narrow range. Although Goodrich stockholders were offered rights to subscribe to the firm's new bond issue at 98, a considerable portion remained in the hands of the underwriters for public offering. Prices of the leading rubber company shares on May 20 compare as follows:

	Last Price		High	Low
	May 20	May 5	—1930—	
Ajax	1⅝	1¾	2½	1⅜
Falls	—	—	4⅜	3
Faultless	—	35	37	24⅝
Firestone	22	23¾	33⅛	21⅝
do. 6% pfd.	—	80¼	87¾	73¾
Fisk	3¾	3⅝	5½	3
do. 1st pfd.	13⅜	—	21	13
General	125	—	163	135
do. pfd.	—	—	91	88½
Goodrich	40	37	58½	35
do. pfd.	—	96¼	104½	95⅝
Goodyear	83	76	96⅞	62
do. 1st pfd.	—	100¾	102	90
India	20	—	25½	8½
Intercontinental	—	5	7½	4¼
Kelly Springfield	4¼	4¼	6⅛	3¼
do. 6% pfd.	—	—	39	29
Lee	6¾	7	11	6¼
Mohawk	12½	10	14	8
do. pfd.	—	—	55	50
Norwalk	2	2	4	⅞
Pirelli	44¾	44⅜	50⅞	44⅛
Raybestos-Manhattan	39	36⅜	58½	33
Seiberling	8	7½	18½	6¼
do. pfd.	—	—	78	40
U. S. Rubber	28	26⅞	35	21⅛
do. pfd.	49½	47	63⅞	47

Names in the News

RAYMOND C. FIRESTONE, son of HARVEY S. FIRESTONE, president of the Firestone Tire & Rubber Company, was unanimously elected captain of the freshman polo team at Princeton University on May 13. His older brother, LEONARD K. FIRESTONE, is captain of the Princeton varsity polo team, which holds the intercollegiate indoor championship.

DR. GEORGE F. ZOOK, president of Akron University, was the principal speaker at a banquet given on May 1 by the Goodyear Tire & Rubber Company for university students working on a part time basis at the Goodyear plant. "Co-operative Education" was the subject of his address.

OLIVER L. THOMPSON has been appointed by the United States Rubber Company as

O. L. THOMPSON

assistant general manager and general sales manager of the sundries department, with headquarters at Providence, R. I. The products of the sundries department are hard rubber goods, golf balls, soles and heels, druggists' sundries, tile flooring, bathing apparel and rubber thread. Mr. Thompson has for the past 17 years been manager of the sundry department of the Davis Brothers Drug Company, Denver, Col.

E. A. ARMIT, chief chemist of the Mechanical Rubber Company, Chicago, Ill., has resigned to accept a position as assistant chemist for Van Cleef Brothers, manufacturers of tire repair materials and other rubber products at the same city.

W. S. BRINK has been appointed engineer in charge of all development at the Firestone Steel Products Company. Mr. Brink, who joined the Firestone company 15 years ago after leaving Purdue University, has served as development engineer for rims and allied equipment at the plant for several years and is widely acquainted in the motor car, truck and wheel manufacturing industries. He first started work as construction engineer and then spent several years in machine construction and operation at Plant No. 1 during its large expansion program. He was at Plant No. 2 as master mechanic during the installation of equipment for government work, including manufacture of balloons and other products under the ordnance division, and during the post-war installation and operation of machinery for making tires. After six years at Plant No. 2, Mr. Brink was called to the Steel Products Company, in charge of engineering of factory operations, and later took up development work.

HUGH ALLEN, manager of the publications department of the Goodyear Tire & Rubber Company, is recovering from lacerations and bruises about the head received when an express bus crashed into his automobile and forced it into an electric light pole on May 13. The accident occurred at Market Street and Buchtel Avenue, Akron, and Mr. Allen was treated for his injuries at the City Hospital.

ARTHUR W. MCMAHON has been appointed by the Murray Rubber Company, Trenton, N. J., as general sales manager. Mr. McMahon was previously connected with Raybestos-Manhattan, Inc., and with one of its predecessor companies for several years and has had considerable experience in the chain store field.

WILLIAM H. SAYEN, JR., president of the Mercer Rubber Company, Trenton, N. J., has returned to his offices from an extended business trip through the western states.

MAJOR H. J. JAMES, together with 17 officers and 90 enlisted men of the Motor Transport Division of the Quartermaster's Corps, United States Army, visited the Akron factories of the B. F. Goodrich Company on May 10 and made a complete tour of inspection. Major Lawes and his men were specially interested in the truck tire division.

E. BILLINGS, JR., sales manager of Godfrey L. Cabot, Inc., Boston, Mass., recently sailed for a six-week combination business and pleasure trip through England and Europe.

P. L. DILDINE, engineer in charge of time study, standards and budgets for the B. F. Goodrich Company, was elected vice-president of the American Management Association in charge of the personnel division at the meeting of the directors of the organization on May 13 at the Hotel Astor, New York City. P. D. BETTERLEY, assistant treasurer of the Graton & Knight Company, was named vice-president of the association in charge of the insurance division.

DR. WOLFGANG KLEMPERER, research engineer of the Goodyear-Zeppelin Corporation, read a paper prepared by CAPTAIN ERICH OFFERMAN of Berlin, Germany, on "The Economics of Airplane Transportation" before the fourth national meeting of the aeronautic division of the American Society of Mechanical Engineers at Dayton, on May 22.

LEE SHOENHAIR, pilot of the "Miss Silvertown" test plane of the B. F. Goodrich Company, has been attempting to capture new aviation speed records during the past few days. He is expected to try to break the present border to border record from Canada to Mexico, probably by flying from Vancouver, British Columbia, to Tia Juana, Mexico, and later to attempt to better the present records for 500, 1,000, and 2,000 kilometers, carrying no added weights. The measured distance speed tests will be conducted near Saltonesa, Elcentro, Mexico

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C. A. DWYER has joined the sales department of the Akron Rubber Reclaiming Company, Barberton, O., after three years of absence from the rubber industry, during which time he had been sales manager of

C. A. DWYER

the Richardson Motors Company, Chrysler distributor, and Ohio representative for the Texas Company. Previously he was in the sales department of the Goodyear Tire & Rubber Company for four years, later becoming associated with the Seiberling Rubber Company. One of Mr. Dwyer's earliest connections in the rubber business was in the sale of reclaimed rubber for the Goodyear Tire & Rubber Company, and his many friends in the trade will welcome him back to his old business.

GEORGE M. KRYDER, who has been in charge of bus sales for the Firestone Tire & Rubber Company for the last five years, has been promoted to the position of manager of the truck and bus sales division, succeeding L. G. FAIRBANK, who has been named trade sales manager. Joining Firestone in 1914 following a chemical engineering course at the Case School of Applied Science, Cleveland, O., Mr. Kryder has advanced rapidly in the organization. He started as a production follow-up man, spending 10 years in actual production work, the latter years in charge of production planning, stores and service departments. Six years ago, he was transferred to the manufacturers' sales department and went to the truck and bus division a year later.

Rubber News Around the World

CONTINENTAL SUBSIDIARY REPORTS INCREASED DEBT

According to the Frankfurter Zeitung, the business report of the Continental Gummi-Werke, Hannover (Continental Rubber Works) revealed nothing in connection with its Dutch affiliate, which in turn is connected with the N. Y. Internationale Continental Caoutchouc Compagnie in Amsterdam, the company that does the export business.

The balance sheet of this Dutch firm indicates debts of 8,210,000 florins, as against credits or 3,960,000 and a stock on hand valued at 4,370,000 florins. The stock capitalization of the Dutch firm amounts to 1,000,000 florins, of which about 20 per cent has been called. Thus it is obvious that the Internationale Continental is operating largely on foreign credit, which is not without significance in connection with the general situation of the Continental Gummi-Werke, A. G.

Whether the Continental Gummi is furnishing the Dutch offspring with any of this credit, or whether it is securing the credit obligations of the Dutch firm, is not revealed in the business report. The balance sheet discloses no acceptance account.

Tan Kah Kee Plant is Burned

A fire last month destroyed the tire plant of Tan Kah Kee at Singapore, the only tire factory in British Malaya. According to a cablegram from Don C. Bliss, United States trade commissioner at Singapore, the shoe factory and the reclaimed rubber department were also devastated, the total damage being in the neighborhood of $250,000.

Form German Goodrich Company

A company has been organized in Berlin under the name of the German Goodrich Company, G. m. b. H., with a capital of 100,000 reichmarks. The object of the new firm is to represent in Germany the interests of the American parent organization, the B. F. Goodrich Company, and its branch factories in France and England.

CATALPO
for
Footwear

Rubber Exhibit at Kobe

An exhibition in connection with the rubber industry of Hyogo Prefecture was held recently at the Industrial Hall Minatogawa at Kobe, Japan. More than 8,400 articles were displayed, comprising almost all varieties of rubber manufactures.

March Golf Ball Imports

Imports of golf balls into the United States during March numbered 182,668, valued at $58,636, as compared with February imports of 158,500 balls, worth $53,466. In March, 1929, there were 325,453 golf balls imported into this country, valued at $125,013. The unit value per ball in March, 1930, was 32.1 cents, as compared with 33.7 cents in February and with 32.2 cents in January.

BELGIAN TIRE COMPANY REPORTS HIGHER PROFIT

The Englebert branch of the Belgian tire trust reports satisfactory earnings in its much enlarged Luetticher plant despite lower prices. At present daily production consists of about 2,500 automobile tires and 7,500 bicycle tires. The Englebert company is the largest Belgian rubber firm, and the marked growth in rubber goods production in Belgium is due entirely to the expansion of this one concern.

Moreover, the new plant in Achen is to be operated in 1930 for the purpose of supplying Germany and the Scandinavian and east European countries. Savings in the payment of tariff charges are estimated at 10,000,000 Belgian francs.

Rubber Industry in France Is Stable with Wages Higher

THE general economic condition of France is stable. There is no unemployment and foreign workers are entering the country, under the supervision of the Ministry of Labor, at the rate of 1,500 per week. To a certain extent the rubber industry is sharing in the prevailing sound condition, with 180 factories in operation employing about 60,000 workers.

The majority of the workers is found in the four tire manufacturing plants—Michelin, Dunlop, Goodrich, and Hutchinson — a great proportion of the employees being women and girls. In recent years the supply of native labor has been inadequate and employment has been given to immigrants from nearby European countries and North Africa. The Moroccans are said to make the best of the immigrant laborers for the heavier and more disagreeable tasks. At present most plants are operating at 10 to 25 per cent under capacity and the labor on hand is adequate, but it is possible that a shortage of qualified workers will be experienced in the late spring, as was the case in 1929.

Wages Increased During 1929

Wages increased in the rubber industry by an average of 12 per cent in 1929, and a further advance is foreseen upon the taking effect of the national social insurance law. This law was due to become operative from February 5, 1930, but the date was postponed, pending parliamentary revisions in certain provisions of the text. The average wages in the Paris region for workers in the rubber industry are equivalent to $0.20 per hour for men and $0.16 per hour for women. It is stated that practically all the work is done on a piece basis. The 8-hour day and 48-hour week prevail by law, but except in periods of general unemployment, overtime work is allowable and in some plants the pay is at the same rate as for the normal time. One provision of the labor laws that restricts certain continuous operations is that forbidding the working of females after 10 p. m. This makes it impossible to conduct more than two shifts on the jobs where women are exclusively engaged. It is customary in many of the operations requiring continuous use of machines, in order to keep down costs, to have three shifts of male workers per 24 hours and to keep the machines going from Monday morning to Sunday morning.

Bonuses and Premiums for Workers

In addition to the regular wages paid, some of the rubber manufacturing plants in France allow annual bonuses or premiums to workers who have been in the company's service for six months or more, with graduated increases for longer periods. Profit sharing is not practiced and there is no stock ownership among the workers, but in certain of the establishments — particularly that of Michelin at Clermont-Ferrand — rewards are given to the best workers through a distribution of "parts," similar to founders' shares, which entitle them at the end of t year, to fixed dividends.

The Michelin plant is one of the most advanced in France in the treatment of its workers. In addition to supplying them comfortable homes at low rentals, it grants disability and maternity indemnities, operates cooperative stores, furnishes free medical aid, maintains social centers, conducts a gymnasium, and promotes athletic activities.

Despite all the efforts made to improve the workers' ability and morale, with continuous simplification of methods and improved machinery, it is said by a factory superintendent in a position to know that the average worker in France in the rubber industry can produce not more than two-thirds of the daily product of the average worker in the factories at Akron, Ohio.

Rubber Goods and Specialties

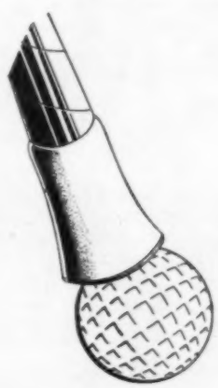
Fisk White Sidewall Tire

White sidewall tires are the latest addition to the line of products manufactured by the Fisk Rubber Company, Chicopee Falls, Mass. This new item will be known as the Fisk DeLuxe white sidewall tire and will be available in the 6.00, 6.50 and 7.00 sizes. Fisk now offers car owners their choice of

white or black sidewalls in the six-ply DeLuxe line, as production of DeLuxe casing with black sidewall will continue unaffected. Like the rest of the line, this new addition is built on the Fisk Air-Flight principle of construction, said to permit a larger air chamber.

Golf Ball PiKuP

Under the name of the Golf Ball PiKuP, golfers are now offered a new and entirely different device for removing golf balls from the cup. It is made of latex rubber and operates by suction, working equally well on either the new or old type golf ball. The device fits conveniently on the end of the putter handle, and its light weight of



only 2/5 oz. does not upset the balance of the club. It is sold to retail for 75 cents and is packed in an attractive 24-carton display by the manufacturers, the Golf Ball PiKuP Company, 2 Columbus Circle, New York City.

Airubber Boat

A new inflatable boat for general utility is being offered by the Airubber Department of the New York Rubber Corporation, Beacon, N. Y. This Airuber boat seats two adults comfortably and is said to row easier than the lightest canoe. The size is 3 feet, 4 inches, beam by 8 feet, 2 inches, over all, and the weight is approximately 24 pounds. The raised pointed bow and raised stern are of inverted-V construction. Two separate air chambers, providing double safety, are approximately 14 inches in diameter when inflated, giving ample freeboard. The material is heavy rubber-coated airplane cloth, the strongest material of its weight, and is made to government specifications, having a tensile strength of 100 pounds per square inch. The bottom is frictioned and rubberized duck and is snagproof. The carrying capacity, when inflated, is above 500 pounds.

Packaged Rubber Sheeting

Among products that have recently followed the modern trend to packaged distribution is du Pont rubber sheeting. This material, which has for years been successfully used for protection in hospitals and institutions throughout the country, is now available in retail stores for home use. Each cut sheet is supplied in an individual box. These boxes—shipped in cartons of twelve or six cuts, depending on the size of the sheet—are of unusual design and are finished in blue, black and red. There is a size and a grade in the new packaged form for practically every household requirement. This sheeting is manufactured at the Rubber Division of E. I. du Pont de Nemours & Company, Fairfield, Conn., and is sold to the dry goods and notion trade exclusively through Strauss Brothers & Company, 114 East 23rd Street, New York City.

Golfer's Rain Cape

The "U. S." golfer's rain cape is a recent addition to the line of products handled by the golf ball division of the United States Rubber Company, 1790 Broadway, New York City. This cape has not been designed to take the place of raincoats nor to provide full protection for golfers who want to play

in the rain. It is designed primarily for the golfer who finds himself caught in a shower while out on the golf course. With the rain cape in his golf bag, such a golfer finds himself able at a moment's notice to protect his body and arms against a bad wetting. The cape, which is of the poncho type, fits loosely and is light in weight so as to permit the wearer full freedom to swing his arms. It is offered in two sizes, medium and large, each to retail at $1, and distribution is being effected exclusively through club professionals and managers.

Tyer Seal Floats

The line of beach goods of the Tyer Rubber Company, Andover, Mass., has been augmented by floats in the form of a seal. The large seal float illustrated is in a bright green color with yellow and black markings and is offered in a length of 42 inches and a width of 30 inches, weighing approximately 2½ pounds. A smaller size is 32

inches in length, 22 inches in width, and weighs about one pound. The larger size is equipped with a special valve. This, like the same company's lobster, horse, frog and alligator floats, is rapidly winning popularity at the various beach resorts of the country.

Current Crude Rubber Items

HALT IN LAND GRANTS URGED BY SWETTENHAM

The present month's suspension of rubber production in the Far East will not prove sufficient to bring about a marked improvement in prices, according to Sir Frank A. Swettenham, foremost British rubber producer, in a statement which had just been forwarded from London to members of the Rubber Exchange of New York.

"Even a repetition of the expedient would hardly do more than give temporary relief," he says, "because the power to produce an excessive quantity of rubber is always there and any rise in price would prove a strong temptation to use it.

"I think Malaya is capable of producing a greater tonnage than we have yet seen, and it is known that the Netherlands East Indies have a large acreage of young rubber trees approaching maturity."

A more effective measure, Sir Frank believes, would be for the governments in the East to withhold further grants of land for rubber planting for a period of from three to five years. "Considering the importance of the industry, the very large sums invested in it and its value as a revenue producer and labor employer, I feel this would be a wise policy," he concludes.

Matale Planters Meeting

Reviewing the past year at the annual meeting of the Matale Planters' Association, Ceylon, the chairman, D. J. Malcolmson, said that a considerable revival of interest in the question of bud-grafting was noticeable during the year. This, he said, was largely as a result of facts disclosed to the position in Java by Mr. Lord of the Department of Agriculture on his return from a visit to that country.

Ask Saturday Exchange Closing

Members of the Rubber Exchange of New York are circulating a petition providing for the closing of the exchange on Saturdays during the months of June, July and August of the present year. The board of governors is asked in the petition to appoint a day for balloting on the question.

Dunlop Plantations Profit

Dunlop Plantations, Ltd., all of whose shares are held by the Dunlop Rubber Company, Ltd., has reported for the year ended December 31, 1929, a net profit of £306,954, or approximately $1,495,000, as compared with £163,498 in the previous year. The payment of common dividends absorbed £133,000, compared with £13,500 during the year previous.

JOHORE PLANTERS ADOPT BAN ON SUNDAY TAPPING

An important branch of the rubber growing industry in Malaya, the Johore Planters Association, has placed restrictions of production on a weekly basis, it is stated in a cablegram from Singapore received May 12 by the Rubber Exchange of New York. The cable reads:

"The Johore Planters Association today passed a resolution favoring the government's suggestion that a weekly rest day be observed by rubber plantations and by native growers. To carry this out, tapping of trees on Sundays will be prohibited.

"The association rejected, however, the government's second suggestion that tapping be prohibited during the bimestre wintering season (two months during the Malayan wintering period)."

BUD-GRAFTING TALK IS HEARD BY CEYLON ASSN.

The 41st annual general meeting of the Ceylon Association in London was held at that city on April 28. Walter Shakespeare, president of the association, was re-elected for another term, and the members heard a brief talk by C. E. A. Dias on bud-grafting and soil erosion.

Mr. Shakspeare reviewed some of the principal activities of the year and expressed his regret that Ceylon-controlled interests have given only lukewarm support to the proposal for a cessation of tapping during May. Speaking of the development of rubber roadways as an outlet for the crude commodity, he deplored the lack of enthusiasm displayed by road surveyors and municipal bodies and the lack of encouragement from the Ministry of Transport.

Mr. Dias declared that although the whole of the rubber industry in the East was gone originally from Ceylon, that territory itself has been late in adopting bud-grafting. He mentioned that as a result of bud-grafting he had done with a few trees in Ceylon in 1922 he obtained an average yield of over 1,000 pounds an acre.

GOVERNMENT OF MALAYA DENIES LAND FAVORITISM

A recent statement by the United States Department of Commerce that the British Malayan government has favored the large rubber manufacturing companies in land grants for rubber cultivation is "entirely groundless," according to officials of the Malayan government whose views were transmitted in a cable from Singapore May 10 to the Rubber Exchange of New York.

The Rubber Division of the Department of Commerce had stated in a review of the rubber situation recently that "The policy of the Malayan government in alienating ground for rubber cultivation is to favor manufacturers by granting them land at low rates of premium, and to penalize rubber companies who wish to plant rubber as agriculturists and not as manufacturers by exacting from them very much heavier rates of premium."

To this the Malayan officials have replied: "The government is satisfied that the statements are entirely groundless, and emphatically contradicts the allegation regarding the favoring of manufacturers in alienating new rubber lands."

Rubber at Los Angeles

Crude rubber imports through Los Angeles harbor during March amounted to 3,885 tons, compared with 2,087 tons in March, 1929. Exports of tires and tubes through the harbor during March amounted to 863,260 pounds, compared with 619,237 pounds in the 1929 month.

Closing Prices on Rubber Exchange of New York, Inc.

FROM MAY 5 TO MAY 17, 1930

		Spot	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	Sales
Standard No. 1 Contract of 10 Tons															
May	5	——	14.10	14.27	14.44	14.64	14.84	15.04	15.24	15.44	15.61	15.78	15.95	16.12	25
	6	——	14.15	14.32	14.49	14.69	14.89	15.06	15.22	15.39	15.57	15.76	15.95	16.12	32
	7	——	14.22	14.38	14.55	14.75	14.95	15.12	15.28	15.45	15.63	15.81	15.99	16.18	16
	8	——	14.38	14.49	14.66	14.86	15.06	15.23	15.39	15.55	15.73	15.91	16.09	16.28	37
	9	——	14.50	14.66	14.82	15.02	15.22	15.39	15.55	15.71	15.89	16.07	16.25	16.43	26
	10	——	14.38	14.53	14.68	14.88	15.08	15.25	15.42	15.59	15.77	15.95	16.13	16.31	4
	12	——	14.18	14.33	14.48	14.71	14.95	15.12	15.29	15.47	15.65	15.83	16.00	16.18	6
	13	——	14.35	14.50	14.65	14.84	15.03	15.20	15.36	15.53	15.71	15.89	16.07	16.25	30
	14	——	14.26	14.41	14.56	14.75	14.94	15.14	15.34	15.54	15.74	15.89	16.05	16.22	26
	15	——	14.25	14.42	14.60	14.75	14.91	15.08	15.24	15.41	15.57	15.73	15.89	16.05	22
	16	——	14.15	14.28	14.42	14.50	14.78	14.95	15.11	15.28	15.44	15.60	15.76	15.92	13
	17	——	14.05	14.14	14.24	14.42	14.60	14.75	14.90	15.05	15.15	15.30	15.45	15.60	21
"A" Contract of 2½ Tons															
May	5	14.00	13.90	14.00	14.30	14.40	14.60	14.80	14.90	15.10	15.30	15.50	15.70	15.90	359
	6	14.20	14.00	14.10	14.30	14.50	14.70	14.90	15.00	15.20	15.40	15.50	15.70	15.90	197
	7	14.30	14.10	14.20	14.40	14.60	14.80	14.90	15.10	15.20	15.40	15.50	15.70	15.90	211
	8	14.30	14.10	14.30	14.50	14.70	14.90	15.10	15.20	15.40	15.60	15.80	16.00	16.20	40
	9	14.50	14.30	14.50	14.70	14.90	15.10	15.30	15.40	15.50	15.70	15.90	16.10	16.30	127
	10	14.40	14.20	14.30	14.50	14.70	14.90	15.10	15.20	15.40	15.60	15.80	16.00	16.20	99
	12	14.30	14.00	14.10	14.30	14.50	14.70	14.90	15.00	15.20	15.40	15.60	15.80	16.00	58
	13	14.40	14.20	14.30	14.50	14.70	14.90	15.10	15.20	15.40	15.60	15.80	16.00	16.20	28
	14	14.30	14.10	14.10	14.30	14.50	14.70	14.90	15.10	15.30	15.50	15.60	15.80	16.00	47
	15	14.20	14.00	14.10	14.30	14.50	14.80	14.90	15.10	15.20	15.30	15.50	15.70	15.90	36
	16	14.10	14.00	14.10	14.30	14.50	14.70	14.90	15.00	15.10	15.30	15.40	15.60	15.80	80
	17	14.00	13.90	14.00	14.10	14.20	14.40	14.50	14.60	14.80	15.00	15.10	15.30	15.50	207

GOLDEN STATE RUBBER ENTERS PLASTICS FIELD

The Golden State Rubber Mills, which has specialized in making heavy service molded rubber goods for the past eight years, recently entered the resinoid plastics field, molding Bakelite and Aldur, particularly for the petroleum and motion picture industries. Both rubber compounding and plastic molding are under the supervision of R. B. Stringfield, formerly chief chemist of the Goodyear Tire & Rubber Company of California.

The company, which was formerly known as the Long-Turner Corporation, has a factory located at 1920 East Vernon Avenue, Los Angeles, Cal.

J. M. HUBER ACQUIRES LARGE GAS RESERVES

The J. M. Huber Petroleum Company was incorporated recently as an oil and natural gas producing organization. The new company controls about 4,800 acres in the heart of the Hutchinson County fields in the Panhandle of Texas.

At the present time there are eight producing oil wells on the property and an estimated open gas flow in excess of five hundred million cubic feet per day. This amount of gas, if burned into carbon black, would produce over two hundred million pounds, or half the world's demand, per year.

Additional oil wells are being drilled at the present time. The natural gas flow is held in reserve against the Huber company's future expansion in natural gasoline and carbon black operations.

Texas May Tax Carbon Black

A proposal to tax gas used in the manufacture of carbon black is contained in a bill introduced recenty in the Texas House of Representatives. The bill provides for a tax of one-quarter of a cent a pound on all carbon black manufactured.

Mason Sues Former Head

The Mason Tire & Rubber Company, Kent, O., has filed suit against its former president, Henry Garrison Keller, for the amount of $527.14, which he is alleged to have withheld from the firm. Mr. Keller was elected president of the reorganized company in February, 1929, and resigned in early September.

CATALPO

for

Cushion Stocks

Camden Rubber Firm Formed

The Camden Rubber & Asbestos Company, 333 Arch street, Camden, N. J., has been incorporated at Trenton, N. J., to manufacture asbestos and rubber goods. The company's capital stock is $50,000, and the incorporators are Benjamin M. Davis, Mollie Harritz and J. Milosk.

American Rubber Co. Expands

The enlarged plant of the American Rubber Company, Emeryville, Cal., is now employing a staff of 125 skilled workers. Organized in 1907, the company has made steady progress, featuring its Cracker Jack fire hose, and is the only manufacturing concern of its kind in the Oakland territory. The founders and owners are three brothers, N. S. Dodge, G. B. Dodge and G. L. Dodge, occupying the positions of president, vice-president and treasurer, respectively.

Name Receiver for Monobloc

The court of common pleas on April 2 appointed Robert N. Wilkin as receiver for the Monobloc Company, hard rubber battery box manufacturer, Dover, O., at the instance of the directors of the firm. Negotiations are under way for the sale of the company's property on such terms that creditors can be paid in full and the business continued.

WORLD RUBBER COMPANY PLANT IS DISMANTLED

The factory of the World Rubber Company at Wadsworth, O., was dismantled last month and the equipment shipped to the headquarters of its parent company, the Braley Midland Company, Catlettsburg, Ky. Both companies have been manufacturers of toy balloons and rubber novelties.

First organized as the Century Rubber Company, the Wadsworth plant was purchased at a receiver's sale by the Braley interests in February, 1927, and operated for about a year and a half with fairly successful results. It was, however, not large enough to justify continuing operation at Wadsworth and for that reason is being added to the parent plant in Kentucky where an additional building is being erected.

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W. A. SNOW APPOINTED TO GOODYEAR COTTON FARM

Welton A. Snow, former city manager at Miami, Fla., has been appointed assistant resident manager of the 37,000 acre cotton plantation of the Goodyear Tire & Rubber Company near Phoenix, Ariz. Shortly after graduating from the M. I. T. at Boston, where he majored in mechanical engineering, Snow entered the employ of Goodyear at Akron. He worked in the engineering department of this company until 1916 when he left to enter the army.

After the war, in which he served as a captain of field artillery, Snow returned to the Goodyear company. He did special engineering work for the company in Brazil and later in California in connection with the opening of a Goodyear plant there. Snow left the company in 1921 to engage in engineering and contracting work at Miami, Fla., later becoming city manager.

Personnel of the Goodyear cotton plantation varies from 400 to 2,000. As a normal thing 400 employees can take care of the plantation, but during cotton picking time a much greater number is required. Goodyear's cotton plantation is expected to produce 5,500 bales this year.

Harshaw Chemical Moves

The Harshaw Chemical Company has moved its New York offices to the eighth floor of the newly completed Chrysler Building at 42nd street and Lexington avenue. The company's New York quarters were formerly at 150 Nassau street.

CLASSIFIED ADVERTISING

Five cents a word, minimum charge $2.00, payable in advance.
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MANUFACTURING EXECUTIVE — Technical graduate, 38 years old, 14 years experience with the industry's leaders in the manufacture of hard rubber goods of all kinds, soft rubber mechanical specialties, automobile body strips and chassis rubbers, heels and soles, rubber tile and mat floor coverings. Present employer moving East, prefer to remain in midwest. Capable of organizing completely for any of the above lines. Address Box 557, THE RUBBER AGE.

CHEMIST — Technical graduate with six years' experience in laboratory, factory control and development work in processing of rubber stocks for large tire company desires position as assistant to either technical or production superintendent of rubber firm. Address Box 558. THE RUBBER AGE.

LATE MARKET PRICES

RUBBER—COTTONS AND FABRICS—CHEMICALS

NEW YORK, MAY 20, 1930

RUBBER

Crude

WITH domestic rubber factories operating more actively than has been the case for a year and with tapping on European plantations presumably at a standstill, the price of crude rubber has sunk down to practically the same low levels that prevailed in late August and early September, 1922, when the British government decided upon its Stevenson restriction plan. The closing spot price for ribbed smoked sheets at New York was 13⅞ cents a pound on both May 19 and May 20, and rubber for May delivery has sold on the Rubber Exchange of New York at 13.70 cents, a new low in the history of that body.

Preliminary estimates for May indicate that crude rubber consumption in the United States will reach 46,000 tons, according to the F. R. Henderson Corporation. This authority estimated April consumption at 41,000 tons, only slightly above the actual figure reported by the Rubber Manufacturers Association of 40,207 tons. The Henderson Corporation also estimates arrivals at all American ports for May at 37,500 tons, which would be a sharp falling off from the 45,423 tons received in April.

Prices quoted on the New York outside market on May 20 were as follows:

Plantations—

Ribbed Smoked Sheets—		
Spot-May	.13⅜@	.14
June	.13⅞@	.14
July-Sept.	.14⅛@	.14⅜
First Latex, crepe spot	.13⅜@	.14
Amber Crepe, No. 2	.13½@	.13¾
Amber Crepe, No. 3	.13¼@	.13½
Amber Crepe, No. 4	.12¾@	.13
Brown Crepe, Clean thin	.13⅛@	.13½
Brown Crepe, specky	.12½@	.13
Liquid Latex, per gal.	.90 @	1.25

Paras—

Up-river Fine	.15¼@	.15½
Up-river Medium	Nominal	
Up-river Coarse	.07½@	.07¾
Acre Bolivian, fine	.15⅝@	.16
Caucho Ball, Upper	.07¼@	.07½
Islands, fine	Nominal	

Centrals—

Central, scrap	.08¼@	—
Esmeraldas	.08¼@	—

Balata—

Block, Colombia	Nominal	
Block, Ciudad	.43 @	.44

LONDON MARKET

Standard Ribbed Smoked Sheets—Buyers

Spot-May	@	6¾d
June-Sept.	6¾@	6⅞d

SINGAPORE MARKET

Standard Ribbed Smoked Sheets—Sellers

Spot	@	6⅝d

Scrap

The gain in production of reclaimed rubber during April and May has put more activity into the scrap rubber market, which for some months past has been extremely dull and quiet. The latest prices quoted were as follows:

(Prices to Consumer)

Auto tire peelings	ton 27.50	@30.00
Standard White auto	ton 40.00	@42.50
Mixed auto	ton 17.50	@19.00
Bicycle tires	ton 15.00	@17.00
Clean solid truck tires	ton 24.50	@25.00
Boots and shoes	cwt. 1.38	@ 1.40
Arctics, untrimmed	lb. .00⅞@	.01
Inner tubes, No. 1	lb. .07 @	.07¼
Inner tubes, No. 2, compounded	lb. .03⅝@	.03¾
Inner Tubes, Red	lb. .03⅝@	.03¾
Air Brake Hose	ton 17.50	@20.00
Rubber Hose	ton 17.50	@20.00

Reclaimed

Considering the Rubber Manufacturers Association returns as 74.8 per cent complete, the consumption of reclaimed rubber in this country during April was 16,904 tons, as compared with 15,241 tons during March. The proportion of reclaim used with relation to crude rubber, however, again showed a decline. Late prices for the various grades were as follows:

High Tensile

Super-Reclaim No. 1 Black	lb. .11¾@	.12
High Tensile Red	lb. .10¾@	.11

Shoe

Unwashed	lb. .07 @	.07⅛
Washed	lb. .09 @	.09⅛

Tube

No. 1 (Floating)	lb. .12 @	.12⅛
No. 2 (Compounded)	lb. .09 @	.09⅛

Tires

Black	lb. .07 @	.07⅛
Black, selected tires	lb. .07¼@	.07⅜
Dark Gray	lb. .08¼@	.08⅛
Light Gray	lb. .09⅛@	.10
White	lb. .11 @	.11⅛
Truck, Heavy Gravity	lb. .07 @	.07¼
Truck, Light Gravity	lb. .07¼@	.07⅛

Miscellaneous

Mechanical blends	lb. .06 @	.06⅛
Red	lb. .10⅛@	.11

COTTON and FABRICS

Cotton

WHILE cotton has lost fractionally in quotations during the fortnight, it still remains at a price well above that of a month ago, contrary to the course taken by rubber and other commodities. The spot price quotation for middling upland cotton closed on May 20 at 16.40 cents a pound as against 16.55 cents two weeks ago and 16 cents on April 21.

According to the Census Bureau, the amount of cotton consumed by domestic mills during the nine months ended April 30 was practically 450,000 bales less than in the corresponding period of 1928-29. This fact, combined with the present heavy stocks at consuming establishments and reported curtailments of operations, should make any sharp rally in the commodity unlikely in the immediate future.

The high, low and closing prices on the New York Cotton Exchange on May 20 were as follows:

	High	Low	Close	Close
		May 20		May 5
May	16.22	16.10	16.22	16.34
July	16.34	16.22	16.30	16.44
Oct.	15.22	15.03	15.16	14.30

Tire Fabrics

The latest prices for tire fabrics, showing only slight changes, were as follows:

CORD

Peeler, carded, 23/5/3	lb. .42¼@	.42½
Peeler, carded, 23/4/3	lb. .44¾@	.45
Peeler, carded, 13/3/3	lb. .38½@	.39
Peeler, carded, 15/3/3	lb. .39½@	.40
Egyptian, carded, 23/5/3	lb. .48¼@	.48½
Egyptian, combed, 23/5/3	lb. .53 @	.53½

CHAFERS

Carded, American, 8 oz.	lb. .36½@	.37
Carded, American, 10 oz.	lb. .37½@	.38
Carded, American, 12 oz.	lb. .36 @	.37
Carded, American, 14 oz.	lb. .35 @	.40

LENO BREAKER

Carded, American, 8¼ oz.	lb. .37 @	.41
Carded, American, 10¼ oz.	lb. .37 @	.41

SQUARE WOVEN

Carded, American, 17¼ oz. 23-11 ply	lb. .42½@	.43
Carded, American, 17¼ oz. 10-ply	lb. .35 @	.35½

Sheetings

The sheetings market has remained unchanged during the past fortnight. Late prices, as quoted by the Textile Brokers Association, follow:

40-inch, 2.50-yard	yd. — @	.10¼
40-inch, 2.85-yard	yd. .09⅛@	.09⅛
40-inch, 3.15-yard	yd. .09⅞@	.10
40-inch, 3.60-yard	yd. — @	.08½
40-inch, 3.75-yard	yd. — @	.07¼
40-inch, 4.25-yard	yd. — @	.06¼

Ducks

No price fluctuations and little real activity have been apparent on the cotton duck market during the past two weeks. The latest price quotations are as follows:

Belting and Hose	lb. .33 @	.34
Enameling	lb. .32 @	.32½
Single filling	lb. .14 @	.14½
Double filling	lb. — @	.16

CHEMICALS

THE rate of production at rubber factories this month has been at least equal to 90 per cent of the rate during May, 1929, which was the greatest month on record for production in the history of the industry. This revival of activity has brought a steadily increasing demand for rubber chemicals and compounding ingredients, with promise of even greater consumption in coming months. The prices quoted for carbon blacks and for the better known accelerators and anti-oxidants have remained firm, but several materials used in the industry have shown declines during the month. Among these are litharge, rosin, alcohol, benzol, turpentine and Carnauba wax.

ACCELERATORS

Organic				
A-1	lb.	.24	@	.27
A-5-10	lb.	.33	@	.36
A-7	lb.	.55	@	.59
A-11	lb.	.62	@	.66
A-16	lb.	.57	@	.61
A-19	lb.	.58	@	.62
A-20	lb.	.64	@	.68
A-32	lb.	.90	@	.95
Aldehyde ammonia, crystals	lb.	.65	@	.70
Aniline oil, drums, f.o.b. works	lb.	.15	@	.16
Captax	lb.			
Crylene	lb.	.55	@	.65
paste	lb.	.45	@	.55
Di-Ortho-Tolyguanidine	lb.	.42	@	.44½
Diphenylguanidine	lb.	.30	@	.32½
Dipsol	lb.	4.30	@	4.50
Ethylidene aniline	lb.	.45	@	.47½
Formaldehyde aniline	lb.	.40	@	.42½
Heptene	lb.	.40	@	—
Hexamethylene-tetramine	lb.	.58½	@	.61
Lithex	lb.	.18	@	.20
Methylenedianiline	lb.	.37½	@	.40
Monex	lb.	3.25	@	—
Oxynone	lb.	.68	@	.80
Phenex	lb.	.75	@	—
R & H 40	lb.	.40	@	.42½
R & H 50	lb.	.40	@	.42½
R & H 397	lb.	.75	@	.77½
R-2	lb.	1.95	@	2.15
Safex	lb.	1.20	@	1.25
SPDX	lb.	.75	@	—
Super-Sulphur No. 1	lb.			
No. 2	lb.			
Tensilac, No. 39	lb.	.40	@	.42½
Tensilac, No. 41	lb.	.50	@	.52½
Thermlo F	lb.	.50	@	.55
Thiocarbanilid, drums	lb.	.25½	@	.28½
Trimene	lb.	.75	@	—
base	lb.	1.20	@	—
Triphenylguanidine	lb.	.58	@	.62½
Tuads	lb.			
Ureka	lb.	.75	@	1.00
Vulcanex	lb.			
Vulcone	lb.			
Vulcanol	lb.			
Z 88	lb.	.50	@	.60
Zimate	lb.			
Inorganic				
Lead, sublimed blue	lb.	.08¼	@	—
Lead, white	lb.	.08½	@	.08¾
Litharge, domestic	lb.	—	@	.08¼
Magnesia, calcined, light	per 100 lb.	5.35	@	5.45
heavy	per 100 lb.	3.65	@	3.75

COLORS

Blacks (See Compounding Materials)

Blues				
Prussian	lb.	.35	@	.36
Ultramarine	lb.	.06	@	.32
Browns				
Sienna, Italian	lb.	.05½	@	.12½
Umber, Turkey	lb.	.04½	@	.07
Greens				
Chrome, light	lb.	.30	@	.32
medium	lb.	.31	@	.33
dark	lb.	.34	@	.36
Chromium Oxide, bbl.	lb.	.34½	@	.35½
Reds				
Antimony crimson, 15/17	lb.	.40	@	.44
sulfur, free	lb.	.56	@	.66
golden 15/17 F.S.	lb.	.20	@	.25
Indian English	lb.	.08	@	.11
Domestic (Maroon)	lb.	.11	@	—
Oximony	lb.	.18¼	@	—
Red oxide, pure	lb.	.10	@	.12
Venetian red	lb.	.03	@	.06
Vermillion, quicksilver, English	lb.	1.75	@	1.80
Whites				
Lithopone, Akeolith	lb.	.05 3/5	@	.06
Lithopone, Albalith	lb.	.05¼	@	.05¾
Lithopone, Azolith	lb.	.05¼	@	.05¾
Lithopone, Vanolith	lb.	.05¾	@	—
Titanox B, f.o.b. St. Louis,	lb.	.07¼	@	.07¾
Titanox C, f.o.b. St. Louis,	lb.	.07¾	@	.08¼
Zinc Oxide—American Process				
American Azo:				
ZZZ (lead free)	lb.	.06½	@	.07
ZZ (leaded)	lb.	.06⅝	@	.06⅞
Horsehead Brand:				
Special	lb.	.07	@	.07½
XX Green	lb.	.07	@	.07½
XX Red, lead free	lb.	.06½	@	.07
Kadox, black label	lb.	.10⅜	@	.10⅞
blue label	lb.	.09⅜	@	.09⅞
red label	lb.	.08	@	.08½
Zinc Oxide—French Process				
White seal	lb.	.11¾	@	.11⅞
Green seal	lb.	.10⅝	@	.10⅞
Red seal	lb.	.09⅝	@	.09⅞
Yellows				
Chrome	lb.	.17	@	.17½
Ocher, French medium	lb.	.02	@	.03
domestic	lb.	.01½	@	.02

COMPOUNDING MATERIALS

Aluminum Flake	ton	21.85	@	24.50
Ammonia carbonate, lump	lb.	.07½	@	.07¾
Asbestine	ton	14.75	@	18.00
Barium carbonate	lb.	.03½	@	.05
Barium Dust	lb.	.05	@	.06
Barytes southern off-color	ton	12.00	@	18.00
Western prime white	ton	23.00	@	—
imported	ton	27.00	@	36.00
Basofor	lb.	.04½	@	—
Blacks				
Arrow "Aerfloted"	lb.	.05½	@	.11
Bone Black	lb.	.07	@	.08½
Carbon, compressed	lb.	.05	@	.10
Carbon, uncompressed	lb.	.05	@	.10
Disperso, f.o.b. Louisiana	lb.	.051	@	—
Disperso, f.o.b. Texas	lb.	.05	@	—
Drop Black	lb.	.06	@	.14
Fumonex	lb.	.04½	@	.08
Excello, compressed	lb.	.05	@	.09
Gastex, f.o.b. Texas	lb.	.04¼	@	.05½
Lamp Black	lb.	.10	@	.40
Micronex	lb.	.05½	@	.11
Thermatomic-Thermax	lb.			
Flex	lb.			
P-33	lb.			
United carbon, fob Tex.	lb.	.05½	@	.11
Velvetex carbon	lb.	.04	@	.06
Blanc fixe dry f.o.b. works	ton	75.00	@	90.00
Carrara filler	lb.	.01¾	@	.02
Catalpo (fact.)	lb.	.02	@	—
Clay, China, domestic	ton	8.00	@	9.00
Aerfloted Suprex	ton	10.00	@	22.00
Congaree, c. l. f.o.b. mine	ton	9.00	@	—
Dark Blue Ridge	ton			
Dixie	ton			
Langford	ton			
Lexington	ton	10.00	@	22.00
Mineral Flour, c. l. fob mine	ton	20.00	@	23.00
Par	ton			
Tensulite		15.00	@	—
Glues, extra white	lb.	.22	@	.26
medium white	lb.	.20	@	.24
Magnesia, carbonate	lb.	.08¾	@	.11
Mica, white water grnd.	lb.	.06	@	.08
Off color (biotite)	lb.	.05	@	.07
Rotten Stone powdered)	lb.	.02	@	.05
Soapstone, powdered	ton	15.00	@	22.00
Starch, powdered	cwt.	3.72	@	4.02
Talc, domestic	ton	12.00	@	15.00
Pyrax A	ton			
Whiting, commercial	cwt.	—	@	1.00
English cliffstone	cwt.	1.75	@	2.00
Quaker	ton			
Superfine	ton	10.00	@	12.00
Sussex	ton			
Witco	ton	20.00	@	—
Zinc Carbonate	lb.	.09½	@	.10¼
Zinc Stearate	lb.	.23	@	.24½

MINERAL RUBBER

Genasco (factory)	ton	50.00	@	52.00
Granulated M. R.	ton			
Hard Hydrocarbon	ton			
Paradura	ton	62.50	@	65.00
Pioneer, MR, solid	ton	40.00	@	42.00
Pioneer-granulated	ton	50.00	@	52.00
R & H Hydro-Carbon	ton	27.05	@	29.00
Robertson, MR, solid	ton	34.00	@	80.00
M.R. (gran)	ton	38.00	@	80.00

SOFTENERS

Acids				
Nitric, 36 degrees	cwt.	5.00	@	5.25
Sulfuric, 66°	cwt.	1.60	@	1.95
Tartaric, crystals	lb.	.38	@	.38½
Acids, Fatty				
Laurex	lb.	.15	@	.16
Stearex	lb.	.18	@	.19
Stearic, double pressed	lb.	.17	@	.22
Alkalies				
Caustic soda, 76%	cwt.	3.76	@	3.91
Soda ash, 58% C.L.	cwt.	1.40	@	
Oils				
Corn, refined, bbls.	lb.	.09	@	.10¼
Cottonseed, crude		—	@	.07⅝
Cycline	gal.	.27	@	.34
Degras (c.l. 100 bbls.)	lb.	.03¾	@	—
Less c. l. (10-25 bbls.)	lb.	.04	@	—
Lots less than 10 bbls.	lb.	.04¼	@	.04½
Fluxrite	lb.	.05½	@	.06½
Palm Lagos	lb.	.07⅜	@	.07½
Niger	lb.	—	@	.07¼
Para-Flux	gal.	.17	@	—
Petrolatum, white	lb.	.08	@	.08½
Pigmentaroil	gal.	.21	@	.26
Pine, steam distilled	gal.	.65	@	.70
destructively distilled	gal.	.55	@	.58
Witco Palm Oil	lb.	.11	@	—
Witco Softener (f.o.b. wks.)	lb.	.02	@	—
Resins and Pitches				
Pitch, Burgundy	lb.	.06½	@	.07½
coal tar	gal.	.05½	@	.06
pine, 200 lb. gr. wt.	bbl.	9.00	@	10.00
Rosin, grade K, 280 lb.	bbl.	—	@	7.45
Pigmentar	lb.	.038	@	.0446
Tar Retort, 50 gal.	bbl.	13.50	@	15.00
Solvents				
Acetone, pure	lb.	.11	@	.12
Alcohol denatured, No. 1 bbls.	gal.	.43	@	.45
Benzol, 90%	gal.	.21	@	.23
Carbon bisulphide	lb.	.05½	@	.06¼
Carbon tetrachloride	lb.	.06¼	@	.07
Dryolene (f.o.b. Okla.)	gal.	.10	@	.10½
Gasoline, steel bbls.	gal.	.16	@	—
Naptha, solvent	gal.	.35	@	.40
Rub-Sol (f.o.b .Okla.)	gal.	.09	@	—
Turpentine, spirits	gal.	.51	@	.67
wood	gal.	—	@	.49
destructively distilled	gal.	.40	@	.43
Waxes				
Beeswax, white	lb.	.51	@	.53
Carnauba	lb.	—	@	.34
Ceresin, white	lb.	.10	@	.11
Montan, crude	lb.	.06½	@	.07
Ozokerite, black	lb.	.24	@	.25
green	lb.	.26	@	.30
Paraffin (c. l.—f.o.b. N. Y.)				
Yellow crude scale	lb.	.03¼	@	—
White crude scale 124/126	lb.	.03½	@	—
Refined, 125/127	lb.	.04¼	@	—
Refined, 128/130	lb.	.04½	@	—
Refined, 135/137	lb.	.05¾	@	—
Refined, 138/140	lb.	.07¾	@	—

ANTI-OXIDANTS

Agerite, Resin	lb.			
Powder	lb.			
White	lb.			
Albasan	lb.	.70	@	.75
Antox	lb.			
B-L-E	lb.	.57	@	.60
Neozone	lb.			
Oxynone	lb.	.68	@	.80
Resistox	lb.	.54	@	.57
Stabilite	lb.	.57	@	.62
Stabilite Alba	lb.	.70	@	.75
VGB	lb.	.55	@	.66

SPECIALTIES

Sunproof	lb.	.35	@	.37½
Tonox	lb.	.56	@	.60

SUBSTITUTES

Black	lb.	.08	@	.14
White	lb.	.10	@	.16
Brown	lb.	.08	@	.15

VULCANIZING INGREDIENTS

Sulfur Chloride (drums)	lb.	.03½	@	.04½
Sulfur flour, Ref'n'd, 100% pure (bags)	cwt.	2.40	@	2.75
Commercial (bags)	cwt.	1.75	@	2.10
Vandex	lb.			

TIRES & TUBES
CRUDE RUBBER

STATISTICAL SECTION

AUTOMOBILES
GASOLINE

THAT the continued piling up of stocks of crude rubber throughout the world has progressed to such a point that cessation from tapping for a single month is only a futile gesture, unlikely to have an important effect on the statistical position of the commodity, becomes steadily more apparent. British authorities estimated the total world stocks of rubber, including quantities in the hands of manufacturers and dealers in all countries, at 470,000 tons at the end of 1929, and the excess of production over consumption in the first five months of 1930 must have raised this figure considerably.

English stocks have continued to set new high records and, as predicted, passed the 100,000-ton mark. Combined London and Liverpool warehouse stocks on May 17 amounted to 101,380 tons, as compared with 99,417 tons on May 3. The rate of increase, however, has slowed up appreciably, and rubber tonnage at these ports may now be close to its ultimate peak.

On the other hand, American stocks are not quite so high as had been believed. The Rubber Manufacturers Association has revised its estimate of domestic stocks as of March 31 downward from 156,516 tons to 141,843 tons. Stocks on hand in this country as of April 30 are figured at 148,272 tons.

Latest figures covering imports and exports from the leading producing and consuming countries have been added to the appropriate tables in this section.

PLAN OF THE SECTION

The statistics included in this section have been chosen for their constant importance to the rubber industry. The tables are reprinted in the same relative position in every issue, each table being kept current by the addition of new figures as soon as they become available.

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U. S. Imports and Exports of Crude Rubber

	Gross Imports			Re-exports			Net Imports
YEARS	Long Tons	Total Declared Value	Average Declared Value per pound Cents	Long Tons	Total Declared Value	Average Declared Value per pound Cents	Long Tons
192.	185,394	73,772,677	17.76	5,716	2,414,924	19.86	179,678
1922	301,076	101,843,188	15.10	4,809	1,921,828	17.84	296,267
1923	309,144	185,060,304	26.72	8,772	5,672,819	28.87	300,372
1924	328,056	174,231,331	23.71	10,309	6,057,637	26.23	317,747
1925	396,642	429,705,014	48.36	14,827	19,847,753	59.76	381,815
1926	413,339	505,817,807	54.63	17,671	22,470,583	56.77	395,667
1927	426,258	339,874,774	35.60	27,775	24,715,488	39.76	398,483
1928	439,731	244,854,978	25.03	32,159	18,128,361	25.17	407,572
1929	560,084	239,178,783	19.15	36,485	16,868,733	20.64	523,599
1927:							
July	37,677	21,678,259	37.53	1,958	1,560,853	35.59	35,719
Aug.	32,810	26,396,931	75.92	1,809	1,382,768	34.12	31,001
Sept.	33,301	25,314,412	33.94	3,500	3,036,929	38.74	29,801
Oct.	30,184	22,163,282	32.78	2,513	2,042,713	36.29	27,671
Nov	28,592	27,395,428	31.69	2,469	2,014,196	36.43	26,123
Dec	30,787	22,213,574	32.26	2,655	2,245,754	37.77	28,082
1928:							
Jan.	39,107	30,278,444	34.56	1,988	1,734,990	38.96	37,119
Feb.	33,668	27,763,655	36.82	2,738	2,229,589	36.35	30,925
Mar.	40,611	32,103,042	35.29	3,718	2,587,435	31.07	36,893
Apr.	37,935	27,287,266	32.11	2,272	1,415,024	27.80	35,663
May	31,059	19,058,672	27.39	2,399	1,386,307	25.80	28,660
June	27,765	14,121,219	22.71	2,621	1,400,697	23.86	25,144
July	31,258	14,144,765	20.20	3,087	1,451,446	20.99	28,171
Aug.	31,204	12,860,150	18.39	2,377	1,084,646	20.37	28,827
Sept.	39,255	16,512,019	18.50	3,038	1,384,148	20.34	36,797
Oct.	44,058	18,200,332	18.44	2,405	1,085,407	20.15	41,653
Nov.	36,519	14,878,441	18.19	2,788	1,207,089	18.52	33,731
Dec.	43,511	17,580,966	18.04	2,738	1,165,743	19.00	40,773
1929:							
Jan.	57,564	22,872,943	17.74	3,663	1,773,401	21.61	53,901
Feb.	64,265	24,760,111	17.20	2,955	1,374,733	20.77	61,310
Mar.	50,604	20,330,905	17.98	4,218	2,094,037	22.16	46,386
Apr.	55,725	25,542,726	20.46	3,293	1,624,237	22.02	52,432
May	51,161	24,355,511	21.25	2,336	1,349,690	21.24	48,825
June	41,663	18,799,307	20.14	3,152	1,470,746	20.83	38,511
July	43,944	19,342,147	19.65	3,424	1,590,411	20.73	40,520
Aug.	37,222	16,580,090	19.83	2,644	1,232,217	20.80	34,578
Sept.	34,472	15,214,485	19.70	2,011	861,068	19.11	32,461
Oct.	38,163	16,192,261	18.94	2,614	1,190,510	20.33	35,549
Nov.	43,507	18,189,305	18.66	2,929	1,300,354	19.82	40,578
Dec.	42,952	17,573,330	18.27	2,745	1,007,279	16.38	40,207
1930:							
Jan.	47,496	17,793,563	16.72	3,144	1,077,415	15.30	44,352
Feb.	42,687	14,798,240	15.48	2,280	960,790	18.80	40,407
Mar.	44,976	14,653,243	14.54	3,187	1,192,708	16.71	41,789
Apr.	45,423	14,783,605	14.53				
May							
June							

U. S. Consumption of Crude Rubber

(Rubber Manufacturers' Association statistics raised to 100 per cent—All figures in long tons)

Figures on Monthly Basis

	1923	1924	1925	1926	1927	1928	1929	1930
Jan.	30,106	29,058	29,633	32,196	31,518	34,403	43,002	36,668
Feb.	30,149	25,736	29,761	31,136	30,137	33,702	41,594	32,726
Mar.	36,629	28,385	33,498	32,936	36,141	35,688	44,780	35,914
Apr.	29,085	27,129	34,139	32,696	35,871	32,772	47,521	40,207
May	36,155	25,845	35,322	29,364	34,592	37,333	49,233	
June	24,272	22,753	35,822	28,598	33,801	37,676	43,227	
July	17,685	23,396	36,053	27,577	29,219	37,407	41,526	
Aug.	20,359	28,982	35,909	34,533	33,460	42,927	38,274	
Sept.	17,594	31,497	31,691	32,904	27,214	39,882	34,707	
Oct.	21,321	31,520	29,047	29,836	26,790	40,857	34,800	
Nov.	20,437	27,289	28,853	28,080	26,792	37,461	27,659	
Dec.	31,902	27,199	28,748	26,293	25,492	31,232	23,531	
Totals	305,694	328,769	388,481	366,149	371,027	441,340	469,804	

Figures on Quarterly Basis

Quarter	1922	1923	1924	1925	1926	1927	1928	1929
Jan./Mar.		96,776	87,609	95,263	94,301	99,216	103,558	128,548
Apr./June	127,360	89,493	75,674	104,099	87,109	103,242	103,500	139,226
July/Sept.		55,621	83,813	99,493	93,793	89,210	117,573	113,744
Oct./Dec.	155,067	63,617	92,656	85,789	83,212	80,860	117,597	84,872
Totals	282,427	305,507	339,752	384,644	358,415	372,528	442,227	466,471

Note—The Rubber Association estimates its monthly rubber consumption figures to be 90 per cent complete. Up until 1925 the quarterly figures were likewise estimated to be 90 per cent complete; beginning with 1925 an estimate of 92 per cent completeness has been used. These estimates have been used in raising the figures in this table to 100 per cent. The quarterly figures are generally regarded as the most authentic; the monthly figures may be accepted as preliminary.

Rubber Invoiced to the U. S.

(Reported by American Consuls—Quantities in Long Tons)

During the Week Ended	From Br. Malaya	From Ceylon	From Dutch East Indies	From London & Liverpool	Total
Feb. 15	7,223	1,312	1,315	59	9,909
Feb. 22	7,010	1,223	2,389	51	10,673
Mar. 1	8,146	2,315	2,898	57	13,416
Mar. 8	6,637	925	1,990	45	9,597
Mar. 15	6,256	658	1,786	10	8,710
Mar. 22	7,075	753	1,997	19	9,844
Mar. 29	5,867	1,335	1,462	—	8,664
Apr. 5	7,435	779	2,109	—	10,323
Apr. 12	7,026	1,235	1,527	7	9,795
Apr. 19	6,013	493	1,109	21	7,636
Apr. 26	5,558	642	1,224	—	7,424
May 3	7,703	1,384	1,806	25	10,918
May 10	6,863	891	1,271	11	9,036

Daily Spot Closing Prices of Ribbed Smoked Sheet Rubber—*New York Market, in Cents per Pound*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Ave
1928																																
January	—	—	—	41¾	41¾	41¾	41	41	—	40%	40¾	40%	40½	40½	40½	40	40	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	39¾	39¾	39¼	39	38¾	40¼
February	87½	87½	87½	87⅝	—	86¾	87	—	86⅝	84½	83⅞	—	82½	82	81¾	81¼	81¼	81¼	81¼	80⅜	80⅜	28¾	28½	28½	28½	28½	29	28¾	—	29¼	32¾
March	29	28½	28⅝	28	28¾	28¾	26¾	26½	25¾	25¾	25¾	24¾	23½	25	25¼	25¼	25¼	25¼	25¼	26¾	26	26¼	27¼	27¼	27¼	26¾	27¼	27¼	27⅝	27⅝	26¾
April	—	27¾	27½	27½	21½	21¼	—	—	—	18¾	18¾	18¾	18¾	18¾	18¾	17¾	17¾	17¾	17¾	17¾	17¾	17	17	17	17	17¾	17¾	17¾	17⅝	17⅝	19
May	17½	17¾	18¼	19¼	19¼	19¼	—	18¾	—	19½	19½	18¾	18¾	19	19	18¾	18¾	18¾	18¾	18¾	18¾	18¾	19	19	19¼	20¼	20¼	20¼	20	19	19
June	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19½	19½	19½	19½	19½	19½	19½	19½	19½	19½	19½	19½	19½	19½	19½	19½	19¾	19¾	19¾	19¾	19¾	19¾	19¾
July	—	18¾	18¾	19¾	19¾	19	19	—	19¾	19¾	19½	19¾	19¾	19½	19½	19½	19½	19½	19½	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾
August	19½	19½	19¾	19¾	19¾	19¾	19¾	19¾	20	20	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾
September	—	18¾	18½	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾
October	—	18¾	18½	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾
November	—	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾
December	—	17¾	—	17¾	17¾	17¾	18¼	18¼	18¼	18¼	18¼	18¼	18¼	18¼	18¼	18¼	18¼	18¼	18¼	18¼	18¼	18¼	18¼	18¼	18¼	18¼	18¼	18¼	18¼	18¼	18¼	18¼
1929																																
January	—	18¼	18¼	18¼	18¼	18¼	18¼	18¼	18¼	18¼	18¼	18¼	18¼	18¼	18¼	18¼	18¼	18¼	18¼	18¼	18¼	18¼	18¼	18¼	18¼	18¼	18¼	18¼	18¼	18¼	18¼	18¼
February	22¾	22	21¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾
March	26	26	25¾	26	26	26	25¾	25¾	25¾	25¾	25¾	25¾	25¾	25¾	25¾	25¾	25¾	25¾	25¾	25¾	25¾	25¾	25¾	25¾	25¾	25¾	25¾	25¾	25¾	25¾	25¾	25¾
April	23	23¼	22¾	22¾	22¾	22½	—	22½	22½	22½	22½	22½	22½	22½	22½	22½	22½	22½	22½	22½	22½	22½	22½	22½	22½	22½	22½	22½	22½	22½	22½	22½
May	19¾	19¾	19¾	19¾	19¾	19¾	20¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾
June	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	22	22	22	22	22	22	22	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾
July	20¾	20¾	21¼	21¼	21¼	21¼	21¼	22½	22½	22½	22½	22½	22½	22½	22½	22½	22½	22½	22½	22½	22½	22½	22½	22½	22½	22½	22½	22½	22½	22½	22½	22½
Aug.	21¾	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21
Sept.	—	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼
Oct.	19¾	19¾	19¾	19¾	19¾	19¾	17	17¾	16¾	—	16¾	16¾	16¾	16¾	16¾	16¾	17	16¾	—	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾
Nov.	17¾	17¾	17½	17½	17½	17½	16¾	16¾	—	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾
Dec.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1930																																
January	—	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾
February	15¼	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
March	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾
April	15½	15½	15½	15½	15½	15½	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼
May	14¾	14¾	14¾	14¾	—	14¾	14¾	14¾	14¾	14¾	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Average Spot Closing Prices—Ribbed Smoked Sheets

(New York Market)

Average Price per Pound for Years 1910-1921

Year	Cents	Year	Cents	Year	Cents
1910	206.60	1914	65.33	1918	60.15
1911	141.30	1915	65.85	1919	48.70
1912	121.60	1916	72.50	1920	36.30
1913	82.04	1917	72.23	1921	16.36

Average Monthly Price per Pound Since 1922

Months	1922 Cents	1923 Cents	1924 Cents	1925 Cents	1926 Cents	1927 Cents	1928 Cents	1929 Cents	1930 Cents
Jan.	18.82	32.73	25.86	36.71	79.50	38.75	40.25	20.14	15.24
Feb.	16.12	35.14	25.29	36.01	62.25	38.25	32.75	23.97	15.85
Mar.	14.53	34.21	22.83	41.00	59.00	41.04	26.82	24.55	15.34
Apr.	15.99	32.48	22.51	43.64	51.25	40.86	18.97	21.18	14.98
May	15.25	27.39	18.89	58.47	47.75	40.76	18.99	21.46	—
June	15.11	26.88	18.81	77.26	42.50	37.25	19.59	20.64	—
July	14.67	26.10	22.16	103.16	41.03	34.87	19.40	21.30	—
Aug.	13.93	28.84	26.17	82.99	38.50	35.12	19.46	20.59	—
Sept.	14.44	28.95	27.56	88.88	41.00	33.67	18.47	20.37	—
Oct.	19.78	26.93	31.13	98.01	42.50	34.32	18.83	19.67	—
Nov.	23.88	27.14	34.33	104.80	38.50	37.58	18.26	16.62	—
Dec.	27.42	26.60	37.88	98.51	38.25	40.63	17.97	16.12	—
Average for Year	17.50	29.45	26.20	72.46	48.50	37.72	22.48	20.55	—

London Closing Prices of Ribbed Smoked Sheet

(In Pence Per Pound)

Day	Feb.	Mar.	Apr.	May	Day	Feb.	Mar.	Apr.	May
1	7⅞	7⅞	7⅝	7	17	8	7½	7½	6⅞
2	—	—	7⅝	7	18	8⅛	7½	—	—
3	7½	7⅞	7⅝	7	19	8¼	7½	—	6¾
4	7½	7¾	7½	—	20	8¼	7⅝	—	
5	7½	7⅞	7½	6⅞	21	8¼	7⅝	—	
6	7⅝	7½	—	6⅞	22	8⅜	7⅝	7¾	
7	7¾	7½	7½	6⅞	23	—	—	7⅜	
8	7⅞	7⅝	7½	7	24	8¼	7⅝	7¼	
9	—	—	7½	7⅛	25	8⅛	7¾	7⅛	
10	7⅞	7⅝	7½	7⅛	26	8¼	7⅝	—	
11	7⅞	7½	7½	—	27	7⅞	7⅝	—	
12	8	7½	7½	7	28	7⅞	7¾	7	
13	8	7½	—	7	29	—	7¾	7	
14	8	7⅛	7½	7	30	—	—	7	
15	8	7⅜	7½	6⅞	31	—	7⅝	—	
16	—	—	7½	6⅞					

Average Monthly Price Per Pound

Month	1928 Pence	1929 Pence	1930 Pence	Month	1928 Pence	1929 Pence	1930 Pence
Jan.	19.310	9.942	7.471	Aug.	9.300	10.505	—
Feb.	15.713	11.875	7.948	Sept.	8.530	10.160	—
Mar.	12.736	12.135	7.595	Oct.	8.807	9.620	—
Apr.	8.864	10.490	7.391	Nov.	8.596	8.442	—
May	8.845	10.717	—	Dec.	8.570	7.958	—
June	9.293	10.580	—	Average for Year	10.656	10.291	—
July	9.312	11.065	—				

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market)

Recent Daily Price Per Pound

Day of Month	Apr.	May	Day of Month	Apr.	May	Day of Month	Apr.	May
1	16.65	16.70	11	16.55	—	21	16.00	—
2	16.55	16.60	12	16.55	16.30	22	15.85	—
3	16.80	16.40	13	—	16.55	23	16.30	—
4	16.60	—	14	16.35	16.35	24	16.50	—
5	16.70	16.55	15	16.00	16.35	25	16.25	—
6	—	16.55	16	16.30	16.50	26	16.20	—
7	16.75	16.45	17	16.20	16.50	27	—	—
8	16.55	16.60	18	—	—	28	16.20	—
9	16.60	16.55	19	—	16.30	29	16.30	—
10	16.65	16.55	20	—	—	30	16.60	—
						31	—	—

Average Monthly Price Per Pound

Month	1928 Cents	1929 Cents	1930 Cents	Month	1928 Cents	1929 Cents	1930 Cents
Jan.	19.12	20.22	17.21	Aug.	19.28	18.62	—
Feb.	18.40	20.21	15.62	Sept.	18.67	18.83	—
Mar.	19.38	20.19	15.13	Oct.	19.62	18.46	—
Apr.	20.63	20.29	16.39	Nov.	19.84	17.53	—
May	21.58	19.41	—	Dec.	20.22	17.28	—
June	21.50	18.74	—	Average for Year	19.97	19.03	—
July	21.36	18.62	—				

World Stocks of Crude Rubber

ON HAND OR AFLOAT TO THE U. S.

At	ON HAND			AFLOAT			ON HAND AND AFLOAT		
End of	1928	1929	1930	1928	1929	1930	1928	1929	1930
Jan.	110,244	76,342	120,649	41,256	78,596	61,863	151,500	154,938	182,512
Feb.	108,955	90,058	143,863	43,316	63,325	63,404	152,271	153,383	207,267
March	114,061	100,536	141,843	39,324	56,476	63,646	153,385	157,012	205,489
April	113,083	107,659	148,272	33,986	55,409	63,261	147,069	163,068	211,533
May	105,356	97,192		34,374	55,404		139,730	152,596	
June	90,198	92,061		40,001	46,035		130,119	138,096	
July	83,242	92,535		42,304	38,858		125,546	134,393	
Aug.	68,994	90,769		51,875	41,618		120,869	132,387	
Sept.	68,851	84,362		48,566	49,480		117,417	133,842	
Oct.	66,421	88,483		41,571	62,294		107,992	150,777	
Nov.	61,956	92,219		68,119	62,358		130,075	154,577	
Dec.	66,166	105,138		68,764	62,389		134,930	167,527	

(Rubber Manufacturers' Association figures raised to 100%.)

STOCKS IN GREAT BRITAIN

Stocks in London

(No. of Tons in Wharves and Warehouses, including Latex)

At end of	1928	1929	1930	At end of	1928	1929	1930
Jan.	66,524	25,191	60,434	July	35,429	30,080	
Feb.	62,964	25,554	64,557	Aug.	32,084	35,605	
Mar.	58,272	28,214		Sept.	31,440	42,188	
Apr.	53,425	31,368		Oct.	24,207	47,803	
May	44,628	31,290		Nov.	17,775	52,454	
June	38,756	31,025		Dec.	19,815	54,304	

At End of Recent Weeks

	First Saturday	Second Saturday	Third Saturday	Fourth Saturday	Fifth Saturday
1929					
December	53,431	53,180	53,894	54,260	
1930					
January	56,616	58,990	59,607	59,984	
February	60,460	61,482	62,559	62,725	
March	64,383	66,418	66,885	68,404	69,233
April	71,477	72,333	73,252	74,084	
May	75,540	76,118	76,932		

Stocks in Liverpool

1929					
December	17,922	18,263	18,696	19,059	
1930					
January	19,433	19,640	19,515	20,063	——
February	19,898	19,761	19,677	19,704	
March	20,693	20,727	20,849	21,187	21,198
April	22,008	22,676	22,663	23,546	
May	23,877	23,755	24,448		

STOCKS IN PENANG AND SINGAPORE

(Stocks held by Dealers—Quantities in Long Tons)

End of	1928	1929	1930	End of	1928	1929	1930
Jan.	25,868	29,617	39,727	July	18,663	33,859	——
Feb.	22,867	32,373	44,371	Aug.	18,971	30,534	——
Mar.	20,538	29,437	45,657	Sept.	14,898	32,138	——
Apr.	16,946	26,474	48,473	Oct.	12,149	33,770	——
May	17,437	30,764	——	Nov.	29,188	30,963	——
June	18,207	30,403	——	Dec.	32,895	35,548	——

STOCKS IN OTHER CENTRES

1930 End of	Malaya Mainland	Afloat for Europe[1]	Holland	Colombo	Para and Manaos
Jan.	44,473	28,440	2,134	(2)	3,678
Feb.	41,111		2,159	(2)	4,370
Mar.	39,269		2,220	4,759	3,839
Apr.					4,382
May					
June					

(1) Reported by U. S. Department of Commerce.
(2) Not available.

Rims Inspected and Passed in U. S.

(Tire and Rim Association Reports)

	Total	Per Cent Balloons		Total	Per Cent Balloons
1922	16,297,735	0.0	1926	24,199,524	78.8
1923	23,140,620	0.6	1927	19,700,003	79.1
1924	21,863,311	19.7	1928	24,247,282	81.6
1925	26,001,664	66.8	1929	24,141,502	80.2
1929			1930		
July	1,896,666	78.2	January	1,601,326	84.0
August	1,570,099	79.4	February	1,653,421	78.9
September	2,110,003	80.7	March	2,061,999	79.1
October	1,647,350	76.4	April	2,339,834	81.1
November	596,989	64.7	May		
December	879,259	79.0	June		

U. S. Tire and Tube Statistics

(All Figures Represent Thousands)

AUTOMOBILE CASINGS

Figures for Recent Years

	1922	1923	1924	1925	1926	1927	1928	1929
Production	40,932	45,259	51,633	60,845	61,237	64,439	77,944	78,308
Shipments	39,987	45,204	50,120	59,262	59,002	64,059	74,296	74,021
Inventory[1]	6,132	5,772	7,427	8,142	10,456	10,264	13,624	12,627

Figures for Recent Months

	PRODUCTION			SHIPMENTS			INVENTORY		
	1928	1929	1930	1928	1929	1930	1928	1929	1930
Jan.	5,358	6,722	4,745	5,394	6,626	4,701	9,949	13,712	12,719
Feb.	6,363	6,912	4,859	5,031	5,282	4,474	11,721	15,495	13,238
Mar.	6,819	7,519	5,188	5,731	6,708	5,032	12,389	16,351	13,469
Apr.	6,178	7,884	——	5,812	7,294	——	12,717	16,929	——
May	6,759	8,145	——	6,457	7,184	——	13,024	17,849	——
June	6,692	7,804	——	7,117	7,254	——	12,162	17,957	——
July	6,498	6,475	——	7,895	7,855	——	11,157	15,830	——
Aug.	7,469	5,806	——	8,403	7,845	——	10,034	14,226	——
Sept.	6,802	4,758	——	7,145	5,998	——	9,765	12,875	——
Oct.	7,326	4,919	——	5,717	4,960	——	11,520	12,845	——
Nov.	6,075	3,603	——	4,998	3,558	——	12,579	12,935	——
Dec.	5,605	3,261	——	4,591	3,346	——	13,624	12,627	——

AUTOMOBILE INNER TUBES

Figures for Recent Years

	1922	1923	1924	1925	1926	1927	1928	1929
Production	50,850	60,116	70,706	82,614	76,618	70,823	80,180	78,417
Shipments	49,673	59,072	68,016	81,004	71,591	72,896	77,127	75,298
Inventory[1]	7,643	8,425	11,052	11,313	16,200	13,692	16,117	13,660

Figures for Recent Months

	PRODUCTION			SHIPMENTS			INVENTORY		
	1928	1929	1930	1928	1929	1930	1928	1929	1930
Jan.	5,441	6,517	4,914	6,072	7,242	5,181	12,982	15,386	13,551
Feb.	6,895	6,769	4,943	5,431	5,278	4,627	14,650	16,999	13,905
Mar.	6,231	7,466	5,271	5,731	6,737	5,042	15,573	17,750	14,057
Apr.	6,661	7,634	——	5,702	7,164	——	16,638	18,134	——
May	7,168	7,660	——	6,300	7,038	——	17,702	18,928	——
June	6,953	6,978	——	7,136	6,950	——	17,159	17,741	——
July	6,674	6,178	——	8,729	8,113	——	14,974	16,232	——
Aug.	8,343	5,846	——	9,350	8,183	——	13,931	14,157	——
Sept.	7,103	5,536	——	7,154	6,250	——	13,543	13,424	——
Oct.	6,929	5,310	——	5,662	5,001	——	15,285	13,656	——
Nov.	5,592	3,780	——	5,002	3,712	——	15,743	13,701	——
Dec.	5,184	3,716	——	4,858	3,631	——	16,117	13,660	——

(1) Rubber Manufacturers' Association figures, raised to 100%. The Association estimates its figures to be 75% representative or complete when issued and that basis has been accepted when preparing the statistics in this table.

(2) Held by manufacturers at end of period indicated.

Automobile Production

	United States			Canada			
	Total	Passenger Cars	Trucks	Total	Passenger Cars	Trucks	Grand Total
1923	4,020,255	3,631,728	388,527	146,438	129,228	17,210	4,166,693
1924	3,600,918	3,203,049	397,869	135,246	117,765	17,481	3,736,164
1925	4,265,704	3,760,459	505,245	161,389	139,311	22,078	4,427,093
1926	4,298,799	3,808,753	490,046	205,092	164,483	40,609	4,503,891
1927	3,393,887	2,938,868	453,019	179,426	146,870	32,556	3,573,313
1928							
July	390,445	237,933	52,512	25,226	20,122	5,104	415,671
Aug.	458,429	400,689	57,740	31,245	24,274	6,971	489,674
Sept.	413,722	358,872	54,850	21,193	16,572	4,621	434,915
Oct.	397,096	339,976	57,120	18,536	13,016	5,520	415,632
Nov.	256,936	217,256	39,680	11,769	8,154	3,615	268,705
Dec.	233,135	205,144	27,991	9,425	6,734	2,691	242,560
TOTAL	4,357,384	3,826,613	530,771	242,382	196,737	45,645	4,599,944
1929							
Jan.	402,154	350,617	51,537	21,501	17,164	4,337	423,655
Feb.	466,084	407,589	58,495	31,287	25,584	5,703	497,371
March	584,733	513,266	69,559	40,621	32,833	7,788	625,354
April	620,656	538,679	81,977	41,901	34,392	7,509	662,557
May	603,969	516,055	86,596	31,559	25,129	6,430	635,528
June	545,252	453,956	91,296	21,492	16,511	4,981	566,744
July	500,331	427,213	73,118	17,461	13,600	3,861	517,792
Aug.	499,629	444,711	54,918	14,214	11,037	3,177	513,843
Sept.	415,332	365,651	49,681	13,817	10,710	3,107	429,149
Oct.	380,011	321,195	58,816	14,523	8,975	5,548	394,534
Nov.	217,570	170,928	46,642	9,424	7,137	2,287	226,994
Dec.	119,950	92,717	27,233	5,495	4,426	1,069	125,445
TOTAL	5,358,361	4,603,609	754,752	263,295	207,498	55,797	5,621,656
1930							
Jan.	273,089	235,099	37,990	10,388	8,856	1,532	283,477
Feb.	323,962	276,833	47,129	15,548	13,021	2,527	339,510
March	401,378	336,178	64,200	20,730	17,165	3,565	422,108
April	442,630	375,171	67,459	24,257	20,872	3,385	466,887
May							
June							

Exports of Crude Rubber from Principal Producing Countries

(Long Tons)

	BRITISH MALAYA[1]							DUTCH EAST INDIES[1]						
	Gross Exports	Imports	Gross Exports Minus Imports	Ceylon[2]	India & Burma[3]	Sarawak[4]	British North Borneo[5]	Siam[4]	Java & Madura	Sumatra E. Coast	Other D.E.I.	Indo-China[4]	Amazon Valley	All Other[4]	World Total[7]
1923	252,016	70,432	181,584	39,971	6,416	5,705	4,237	1,718	32,930	46,344	57,822	5,067	16,765	7,856	406,955
1924	259,706	108,524	151,182	39,997	7,697	6,699	4,621	2,962	42,446	54,497	80,347	6,688	23,165	9,065	429,366
1925	316,825	158,022	158,803	49,566	10,082	5,424	5,377	5,377	46,757	65,499	120,626	7,881	25,298	13,797	517,523
1926	391,328	151,243	240,085	58,962	9,874	9,155	6,079	4,027	52,186	71,413	121,231	8,203	24,298	16,017	621,530
1927	371,322	182,845	188,477	55,356	11,321	10,923	6,582	5,472	55,297	77,815	142,171	8,645	28,782	15,638	606,474
1928	409,430	149,787	259,643	57,267	10,790	10,087	6,698	4,813	58,848	82,511	121,770	9,548	21,129	10,690	653,794
1929	574,836	163,092	411,744	81,584	11,663	11,077	7,381	5,018	65,990	87,789	134,037	9,696	21,148	6,767	853,894
1928:															
Mar.	27,879	10,508	17,371	3,683	775	645	581	269	3,999	5,825	9,690	700	2,750	1,211	47,499
Apr.	20,139	9,335	10,804	3,283	789	630	494	258	3,998	5,040	5,499	736	1,014	1,323	35,810
May	26,483	10,350	16,133	3,091	654	842	494	241	4,943	5,355	10,347	717	2,602	1,135	45,994
June	22,994	16,168	6,826	3,107	963	926	494	451	5,419	5,863	13,655	725	1,399	960	40,788
July	30,481	13,383	17,098	5,129	1,043	905	593	366	5,602	7,566	11,594	698	1,264	873	52,731
Aug.	35,674	15,114	20,560	5,720	398	1,227	593	544	5,668	7,438	11,893	712	1,782	450	56,986
Sept.	29,769	11,289	18,480	4,675	457	938	594	447	4,956	6,536	9,863	969	1,614	494	50,073
Oct.	24,476	12,603	11,873	3,999	864	949	564	457	5,295	7,474	10,124	513	1,399	782	44,243
Nov.	68,135	10,436	57,699	8,005	1,048	772	564	425	4,950	7,902	7,805	943	1,790	623	92,526
Dec.	66,763	11,122	55,641	7,848	1,113	744	565	294	5,120	8,792	10,896	948	2,220	588	94,769
1929:															
Jan.	52,546	13,415	39,131	8,301	1,864	878	600	461	5,640	8,067	11,076	850	2,134	642	79,439
Feb.	47,926	12,103	35,823	7,064	1,117	955	600	495	6,572	7,511	10,384	807	2,104	526	73,952
Mar.	49,448	14,553	34,895	6,588	1,413	758	601	499	5,515	6,620	10,629	658	2,832	786	71,289
Apr.	49,816	11,414	38,402	5,097	727	747	548	306	5,997	6,645	11,321	673	1,950	569	72,982
May	43,960	15,593	28,367	5,723	800	966	548	453	6,264	6,961	13,437	1,059	1,922	733	67,233
June	40,398	14,344	26,054	5,563	1,122	1,061	547	422	5,582	6,693	11,270	757	1,398	548	61,017
July	46,454	15,071	31,383	5,457	974	1,247	541	462	6,422	7,192	13,995	575	1,457	543	70,348
Aug.	50,441	15,469	34,972	6,079	685	993	641	431	4,644	7,298	10,782	1,032	1,563	499	69,619
Sept.	53,484	12,392	41,092	7,993	384	832	640	406	4,708	7,517	10,149	655	1,566	504	76,446
Oct.	47,937	12,516	35,421	8,381	812	1,047	671	485	4,697	8,295	10,512	893	1,606	445	73,265
Nov.	46,279	11,204	35,075	6,660	1,065	668	672	278	4,760	6,711	9,380	771	1,442	535	68,017
Dec.	46,147	15,018	31,129	8,683	900	939	672	320	5,189	8,279	11,102	966	1,674	443	70,287
1930:															
Jan.	52,535	11,773	40,762	7,741	1,560	791	600*	386	5,709	7,831	8,920	856	1,837	400*	77,393*
Feb.	48,947	12,960	35,987	7,825	1,245	847	600*	469	6,900	7,191	11,414	944	1,797	400*	75,619*
Mar.	47,320	13,236	34,084	6,269	1,129	976	600*	391	5,796	6,612	11,007	643	1,674	400*	
Apr.	43,813	14,627	29,186	5,030								432	1,201		

(1) Malayan net exports cannot be taken as production, since imported rubber is largely wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 115 tons in 1923, 1,117 in 1924, 3,618 in 1925, 3,263 in 1926, 2,439 in 1927 and 1,437 in 1928. (2) Ceylon Chamber of Commerce statistics until 1926; rubber exported as latex is not included— such shipments were equivalent to 18 tons in 1923, 93 tons 1924, 6 tons 1925, 20 tons in 1926, about ½ ton in 1927, and 1 ton in 1928. (3) Official statistics. (4) Imports into Singapore and Penang. (5) Exports from "Other D.E.I." are chiefly wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 2,342 tons in 1923, 1,008 tons 1924, 2,239 tons 1925, 44 tons in 1926, 84 tons in 1927, and 1,489 tons in 1928. (6) Calculated from official import statistics of principal consuming countries, viz., United States, United Kingdom, France, Germany, Belgium and Netherlands. This figure includes guayule rubber. (7) This total includes the third column for British Malaya, "Gross Exports minus Imports," and all the figures shown for the other territories. *Figure is provisional; final figure will be shown immediately it becomes available.

Net Imports of Crude Rubber into Principal Manufacturing Countries

(Long Tons)

	United States[1]	United Kingdom	France (h)	Germany	Canada (ac)	Japan (da)	Italy	Russia (ce)	Austra-lia (cd)	Belgium (d)	Nether-lands	Scandi-navia (abcdf)	Spain (g)	Czecho-slovakia (abcd)	World Total
1919	236,977	42,671	17,685	5,584	6,395	9,753	9,894	75	1,002	3,995	2,771	3,149	2,418	9	342,878
1920	248,762	56,844	13,885	11,890	11,746	5,297	6,123	62	1,815	3,840	5,510	2,292	2,008	567	370,641
1921	179,678	42,087	15,135	21,920	8,124	21,713	3,906	165	1,014	1,705	1,022	1,279	2,245	569	300,562
1922	296,267	11,724	24,352	27,546	9,207	15,934	6,430	2,493	2,643	172	-3,807	1,778	589	567	395,885
1923	300,372	12,700	27,892	18,519	13,277	15,372	8,489	2,986	1,649	2,184	792	2,528	630	1,128	408,018
1924	317,747	-11,550	30,446	22,727	14,299	19,571	8,764	2,346	3,124	2,688	-807	3,178	944	1,370	414,847
1925	381,815	4,061	32,956	33,937	19,683	11,117	11,412	7,088	4,757	2,930	875	3,149	1,155	1,558	516,493
1926	395,667	84,865	34,240	22,775	20,229	18,125	9,809	6,529	9,021	2,498	2,670	4,046	1,299	1,870	613,649
1927	398,483	60,249	34,271	38,892	26,405	20,521	11,381	12,018	9,490	6,482	636	4,224	2,055	2,672	627,789
1928	404,496	4,846	36,498	37,855	30,447	25,621	12,483	15,134	8,430	7,958	2,243	4,418	3,178	3,128	596,695
1929	526,709	122,675	55,093	49,275	35,453	34,284	17,169	11,774	15,886	9,445	3,022	6,440	864	4,650	892,739
1928:															
Feb.	30,926	3,143	2,526	2,984	2,553	1,248	437	783	616	599	98	307	296	297	46,813
Mar.	36,893	3,179	1,902	3,521	2,989	1,694	763	231	918	816	95	351	497	398	54,247
April	35,663	—2,280	2,204	2,719	1,938	2,334	1,114	1,820	832	575	280	339	304	159	48,001
May	28,660	—5,822	3,297	2,944	2,180	2,288	1,090	3,893	655	746	209	485	220	213	41,558
June	25,143	—3,031	3,597	2,968	2,186	2,102	984	4,111	348	743	133	346	251	182	40,063
July	28,170	—1,374	3,518	3,387	2,692	2,026	1,598	724	591	895	395	294	175	384	42,475
Aug.	28,827	48	3,527	2,744	2,447	1,868	875	632	707	519	316	359	58	94	43,021
Sept.	36,800	4,199	3,524	3,553	2,812	1,837	1,278	20	603	597	345	377	277	235	56,457
Oct.	41,667	—934	3,728	4,386	2,943	3,711	1,049	98	766	696	141	527	250	318	59,346
Nov.	33,846	—3,141	3,278	3,694	2,799	2,150	1,340	689	537	544	81	337	252	282	46,938
Dec.	40,781	8,438	3,633	2,470	2,618	3,002	1,145	1,378	755	639	148	435	263	200	65,906
1929:															
Jan.	53,922	11,951	5,645	4,711	3,759	3,776	1,481	956	1,061	749	218	638	179	525	89,571
Feb.	61,831	5,179	5,001	4,813	2,906	2,727	1,259	684	1,131	627	113	226	115	356	86,270
Mar.	46,391	9,068	4,409	4,586	4,961	2,630	1,515	716	725	931	316	354	80	409	77,091
Apr.	52,447	8,295	4,854	5,351	3,177	2,308	1,407	703	1,518	750	144	956	40	445	82,395
May	48,350	5,112	3,152	3,682	2,937	2,314	1,417	996	1,437	854	201	468	37	277	71,284
June	38,676	4,787	6,814	3,948	3,075	1,593	1,624	695	2,215	672	687	507	24	420	65,737
July	40,914	4,993	4,839	3,559	3,205	2,888	2,023	1,056	2,918	1,039	253	519	30	465	68,201
Aug.	35,207	14,594	4,645	4,082	2,879	3,663	908	1,284	724	902	254	429	25	319	69,865
Sept.	32,171	17,010	3,889	4,691	1,908	3,511	1,224	1,235	853	672	253	361	91	477	68,346
Oct.	35,840	16,111	4,489	3,355	1,821	3,902	1,888	1,073	1,125	1,147	278	710	91	201	71,981
Nov.	40,972	13,141	3,082	3,776	2,709	3,221	1,275	1,226	1,453	361	253	595	62	313	72,439
Dec.	40,488	12,434	4,274	2,921	2,114	2,251	1,198	1,200	726	741	52	677	90	443	69,609*
1930:															
Jan.	44,759	11,106	4,207	3,862	2,842	2,805	910	1,000*	332	612	209	552		577	
Feb.	40,718	10,293	4,482	3,697	2,250	1,386	1,385		457	1,143	188	315		239	
Mar.	42,068	12,346		4,289	3,776		1,083		975						

a—Including gutta percha. b—Including balata. c—Re-exports not deducted in monthly statistics. d—Including some scrap and reclaimed rubber. e—Official statistics of rubber imports by Soviet Russia. f—Including Norway, Sweden, Denmark and Finland. g—United Kingdom and French exports to Spain except in years prior to 1925. h—French imports have been reduced 12 per cent in order to eliminate imports of gutta percha and to reduce to basis of net weight. [1]United States imports of guayule are not included in this compilation; such imports amounted to 4,305 tons in 1926; to 5,010 tons in 1927; to 3,076 in 1928; and to 1,231 tons in 1929. *Figure is provisional; final figure will be shown immediately it becomes available.

Domestic Production of Miscellaneous Rubber Goods

	Rubber Proofed Fabrics Yards	Rubber Heels Pairs	Rubber Soles Pairs	Mechanical Goods Shipments Dollars
1924	25,020,000	186,279,000	(1)	$48,615,000
1925	23,988,000	206,970,000	16,211,620(2)	64,877,000
1926	29,328,000	193,812,000	12,253,000	76,789,000
1927	37,872,000	201,014,000	27,160,000	68,625,000
1928	41,179,000	235,170,000	37,645,000	69,114,000
1929	50,731,000	232,126,000	34,499,000	74,770,000
1929:				
February	3,095,000	18,979,000	2,869,000	6,135,000
March	3,952,000	17,226,000	2,746,000	7,013,000
April	4,000,000	17,256,000	2,601,000	7,035,000
May	4,860,000	19,541,000	2,916,000	7,189,000
June	4,409,000	20,007,000	2,502,000	6,792,000
July	4,260,000	19,315,000	1,295,000	6,306,000
August	5,085,000	23,095,000	2,948,000	6,792,000
September	5,507,000	21,702,000	2,841,000	5,906,000
October	6,116,000	22,386,000	3,502,000	5,887,000
November	4,395,000	17,863,000	3,400,000	4,932,000
December	2,291,000	14,781,000	3,005,000	4,751,000
1930:				
January		15,470,000	3,496,000	5,177,000

(1) Not available; (2) Last 9 months only.
Source: "Survey of Current of Business of the Department of Commerce."

United States Imports of Guayule Rubber and Related Gums

(All quantities in Long Tons)

	Guayule		Balata		Jelutong		Gutta Percha	
	Tons	Dollars	Tons	Dollars	Tons	Dollars	Tons	Dollars
1919	1,430	760,690	727	937,038	8,332	2,213,964	2,900	1,068,698
1920	758	345,985	1,064	1,260,043	5,672	2,068,501	3,183	1,520,309
1921	58	26,945	814	1,077,859	1,745	851,893	985	333,564
1922	127	57,040	812	978,765	2,335	403,812	818	231,012
1923	1,155	542,227	700	898,524	4,565	853,308	912	375,167
1924	1,356	536,392	464	568,456	6,165	1,237,100	1,408	463,610
1925	3,781	1,803,448	517	574,750	6,749	1,642,531	1,603	629,284
1926	4,305	2,562,096	354	327,213	7,263	3,127,757	1,445	661,156
1927	5,018	2,674,957	582	447,246	7,785	2,448,657	1,494	728,172
1928	3,075	1,755,685	731	430,855	7,552	2,540,059	1,597	777,128
1929	1,231	545,175	728	566,964	8,203	2,458,126	447	167,479
1929:								
July	280	86,175	49	46,440	572	180,065	14	5,507
Aug	190	80,442	58	47,769	575	171,733	—	—
Sept.	107	51,156	38	30,327	913	279,225	—	—
Oct.	200	79,968	58	43,756	636	181,421	—	—
Nov.	125	47,796	13	11,600	583	182,677	49	14,935
Dec.	100	41,328	25	19,955	550	156,939	51	12,095
1930:								
Jan.	150	55,272	28	28,549	509	141,384	—	—
Feb.	75	25,956	52	45,319	367	93,087	—	—
Mar.	148	50,007	16	12,498	522	128,844	—	—

Reclaimed Rubber in the United States

(All Quantities in Long Tons—100% Basis)

Year	Production	Consumption Tons	Consumption % to Crude	Stocks*	Year	Production	Consumption Tons	Consumption % to Crude	Stocks*
1920	86,395	75,297	38.4	.....	1925	132,930	137,105	35.6	13,203
1921	36,725	41,351	24.1	.....	1926	180,582	164,500	45.9	23,218
1922	57,324	54,458	19.3	.....	1927	189,144	178,471	47.6	24,980
1923	74,766	69,534	22.7	.....	1928	208,516	228,000	50.4	24,785
1924	80,079	76,072	22.4	.....	1929	215,954	226,528	48.4	27,464
1928:									
Jan.	14,862	20,140	58.5	21,941	July	17,278	19,070	51.0	17,305
Feb.	15,291	18,670	55.4	20,848	Aug.	19,049	17,890	41.7	15,881
Mar.	17,069	20,680	57.9	19,558	Sept.	18,698	17,795	44.6	17,991
Apr.	15,893	19,280	58.8	19,283	Oct.	17,182	18,420	45.1	17,026
May	18,945	20,215	54.1	18,187	Nov.	18,245	18,380	49.1	22,399
June	18,781	18,140	48.2	18,709	Dec.	17,728	14,320	45.9	24,785
1929:									
Jan.	18,885	21,068	49.1	24,394	July	18,387	20,236	48.7	19,679
Feb.	18,094	19,829	47.7	23,305	Aug.	19,787	18,230	47.6	22,309
Mar.	19,984	20,867	46.7	22,076	Sept.	18,660	17,071	49.2	24,984
Apr.	19,899	22,435	47.8	20,680	Oct.	18,865	18,744	53.8	25,117
May	20,385	23,176	47.1	19,479	Nov.	14,363	15,330	55.4	26,050
June	18,416	18,141	42.0	17,980	Dec.	13,429	11,531	49.0	27,464
1930:									
Jan.	15,010	17,454	47.6	24,241	July	.....	.....	.....	.....
Feb.	15,846	14,559	44.5	24,243	Aug.	.....	.....	.....	.....
Mar.	17,400	15,241	42.2	24,415	Sept.	.....	.....	.....	.....
Apr.	17,828	16,904	42.0	24,587	Oct.	.....	.....	.....	.....
May	.....	.....	.....	.....	Nov.	.....	.....	.....	.....
June	.....	.....	.....	.....	Dec.	.....	.....	.....	.....

*Stocks on hand at the end of month or year. Exports of reclaimed rubber, not shown in this table, amounted to 8,540 tons in 1927, 9,577 tons in 1928, and 12,369 tons in 1929.

U. S. Consumption of Gasoline

(In Barrels of 42 Gallons)

MONTHS	1929	1930	MONTHS	1929	1930
January	22,502,000	25,731,000	July	36,866,000	
February	22,776,000	26,509,000	August	37,759,000	
March	28,495,000	31,029,000	September	34,193,000	
April	32,019,000		October	32,816,000	
May	34,117,000		November	31,502,000	
June	33,163,000		December	26,550,000	

REVIEW DESK

Books, New Publications, Catalogues, Etc.

1930 YEARBOOK. Published by the Tire & Rim Association, Inc., 1401 Guarantee Title Building, Cleveland, O. 132 pp. For distribution to members.

Not only does this annual include full statistics on the number of rims of every type inspected and approved by the association from 1923 to 1929, but it also carries complete load and inflation tables, diagrams of rim contours, a summary of the rim equipment of all American cars, valve descriptions and drawings, and an appendix on European standards. The roster of the association membership and the constitution and by-laws are also contained in the volume. The 1930 Yearbook is in the same large size that was inaugurated last year and is augmented by memorandum pages and sectional indexes.

A REVIEW OF 1929 WITCO ADVERTISING. Published by Wishnick-Tumpeer, Inc., 251 Front Street, New York City. 1930. 24 pp. For free distribution.

A graphic presentation of the service offered by Wishnick-Tumpeer, Inc., and its subsidiaries, this brochure contains typical examples of business paper advertisements, a list of the magazines in which Witco advertising appears, and a summary of the products distributed by the organization.

EVOLUTION OF HYDROGEN SULPHIDE FROM VULCANIZED RUBBER. By Edward Wolesensky. Published by the Government Printing Office, Washington, D. C. 1930. 14 pp. $.05.

The rubber-sulfur compound in vulcanized rubber splits off hydrogen sulfide at all times and at all temperatures between 25 degrees Centigrade and the temperature of complete thermal decomposition. The rate of evolution of the gas depends upon the temperature, time, the proportion of combined sulfur, and possibly other factors. The reaction affords a new explanation of the formation of hydrogen sulfide during vulcanization, and possibly also, in part at least, of the excess of combined sulfur over that required by the formula C_5H_8S. It may also be another factor in aging, though, perhaps, only a minor one, and presents a new problem in the regeneration of rubber. The p[a]per is a reprint from the April, 1930, issue of the Bureau of Sta[n]dards Journal of Research.

THE BLACK ART OF RUBBER CO[M]POUNDING. Chat No. 16. Mineral Rubber. Published by the Binney & Smith Company, 41 East 42nd Street, New York City. 1930. 12 pp. For free distribution.

Mineral rubber is, and for many years has been, a standard ingredient in rubber compounds for a very wide range of articles. It is the purpose of this pamphlet to describe the specifications and use of PARMR, the newly developed mineral rubber of the Binney & Smith Company. This is described as a standard blown bitumen residue of thoroughly standardized nature, and the pamphlet gives test formulas and analyses of results with both the No. 1 and No. 2 grades.

SIXTEENTH ANNUAL REPORT. Published by the International Association for Rubber and Other Cultivations in the Netherlands Indies, 5 Nieuwe Doelenstraat, Amsterdam, C., Holland. 1930. 46 pp. For distribution to members.

In addition to detailed statistics on the production of plantation rubber in the Dutch East Indies, this report contains a discussion of local labor problems, taxation and association activities. At the end of 1929 this association had 200 company members and 64 individual members. Appended to its own report, which is printed in both Dutch and English, is a separate 16-page report of its propaganda department, describing the work of that group in developing the use of rubber pads under rails, rubber paints, rubber as a soleing material, rubber flooring and rubber pavements.

SAFETY COMPETITION. Published by the Policyholders Service Bureau, Metropolitan Life Insurance Company, 1 Madison Avenue, New York City, 1930. 16 pp. For free distribution.

Methods of stimulating employe interests in safety by developing the spirit of friendly competition or the desire to excel have proved valuable to many industrial firms. This leaflet, the seventh in a series on industrial safety topics, presents plans for organizing interdepartmental contests which will serve as incentives for safe workmanship.